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ABSTRACT

This study evaluated Ontario Ministry of Education documents and textbooks for environmental content. The documents evaluated were the "Ontario Schools: Intermediate and Senior Divisions" OSIS science and geography curriculum guidelines from grades 7-12. Corresponding textbooks in science and geography were also evaluated. Also investigated was whether the environmental content was presented from an "Environmental Perspective." The "Environmental Perspective" was based on a 20 year analysis of environmental data and issues. Both quantitative and qualitative approaches were used. All of the data used in the analyses are included in the appendices. This study revealed a small amount of environmental content and that this content was not presented from the "Environmental Perspective." Textbooks are negligent in their treatment of environmental issues and this negligence parallels the policies of the Ontario Ministry of Education as revealed in their published curriculum guidelines. (Author/CW)

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AN EVALUATION OF SCIENCE AND GEOGRAPHY DOCUMENTS AND TEXTS IN ONTARIO SCHOOLS FROM AN ENVIRONMENTAL PERSPECTIVE

by

BILL BORGER

A thesis submitted to the Faculty of Education
in conformity with the requirements for
degree of Master of Education

Queen's University
Kingston, Ontario, Canada
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ABSTRACT

This study evaluated Ontario Ministry of Education documents and textbooks for environmental content. The documents evaluated were the new OSIS science and geography curriculum guidelines from grade 7-12/OAC. Corresponding textbooks in science and geography were also evaluated.

This study is novel for it investigates not only how much environmental content exists in Ministry documents and textbooks but also determines whether the environmental content is presented from an "Environmental Perspective." The "Environmental Perspective" is based on a 20 year analysis of environmental data and issues.

Both quantitative and qualitative approaches were used in order to discover not only how much environmental content exists in Ministry documents and texts but also from what perspective the environmental data was presented. All the data for this study is included in the thesis in the form of appendices.

The most striking finding revealed by the research was the small amount of environmental content. Also, another outcome was that a great deal of the environmental content was not presented from an "Environmental Perspective."

The study shows in detail that textbooks are negligent in their treatment of environmental issues and that this

negligence parallels the policies of the Ontario Ministry of Education as revealed in their published curriculum guidelines.

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CHAPTER 1

Introduction

This study examines the quality of curriculum material provided by the Ontario Ministry of Education for students in the province of Ontario. The curriculum documents and textbooks are evaluated for their environmental content. The materials under study are those sanctioned by the Ministry of Education, as outlined in the revised Ontario Schools: Intermediate and Senior Divisons (OSIS, 1989) document. This chapter describes the purpose of the study, defines the term "Environmental Perspective" and concludes with a broad overview of the study.

Purpose of the Study

The purpose of this study is to evaluate, from an "Environmental Perspective," selected geography and science curriculum materials from grade 7-12/Ontario Academic Courses (OAC's) that are used in the schools of Ontario. Curriculum materials are defined by the following:

1. Materials distributed by the Ministry of Education to schools: the OSIS document; the complete science curriculum; and the complete geography curriculum guidelines.
2. Geography and science textbooks sanctioned by the Ministry of Education for use in schools, as per Circular 14.

All documents prepared by individual school boards for the classroom teacher are excluded from this study. The principal focus of this study is to reveal the Ministry's approach to environmental education as expressed through its own documents and through the textbooks it authorizes.

The Ministry of Education does not use the term "environmental education," but it does use similar terms such as "environmental science," "environmental studies," and "environment." This situation is not uncommon; for instance, both Greenall (1981) and Wilke (1985) show that the term "environmental education" has many different connotations but that many teachers interpret it as nature and field studies. Environmental education at the elementary level occurs through the many science and social studies programs. At the high school level, environmental education is limited primarily to the subjects of geography and science. The grade 10-12 environmental science program and the grade 12 environmental studies program in geography are designed specifically for environmental education.

Environmental Perspective

Avis (1978) defines environment as, "The aggregate of external circumstance, conditions and things that affect the existence and development of an individual, organism, or group" (p. 443). Environmental education therefore becomes a program intended to lead to the development of a society that, by its policies and practices, will maintain an environment fit-for-life for all people in the global community.

Contemporary concern for the environment seems to have its origins over twenty years ago. Beginning with Rachel Carson's (1962) Silent Spring, the 1960's brought warnings of imminent ecological disasters. There followed extensive media coverage and public opinion surveys on a variety of environmental issues (Medalia & Finer, 1965). The early 1970's saw the emergence of organizations such as Friends of the Earth, Zero Population Growth, Pollution Probe, and the Club of Rome, all reflecting a widespread concern that action was needed to change the prevailing pattern of misuse of the environment (Stevenson, 1987). It was on April 22, 1970 that the first designated Earth Day was recognized in North America. Limits to Growth (Meadows, 1972) used computer projections to claim that population growth was exponential, and predicted that the planet was

approaching its limits of growth. Environmental issues have had a high degree of exposure for the last twenty years (Arcury & Johnson, 1987). Over the same period, there has been an increase in environmental accidents and incidents, and an increase in our knowledge of materials and processes that are environmentally hazardous. One can construct a timeline of such incidents. This timeline and the knowledge it represents become the background against which the targeted curriculum materials are evaluated.

Overview

Chapter 2 argues the significance of the study. The geography and science documents that were evaluated are presently being implemented in Ontario schools. The previous science and geography curriculum documents existed with minor changes for almost 15 years. For this reason, it is important to measure the amount of environmental content in the documents that are currently being implemented in the schools.

Chapter 3 explains in detail the methodology used in this study, how the "Environmental Perspective" was created for the purpose of evaluating curriculum materials and how curriculum documents and textbooks were evaluated for their environmental content. Examples are provided to aid in the

analysis. All data gathered for the "Environmental Perspective" are included in Appendix A.

Chapter 4 describes the results of the evaluation of the Ministry documents and textbooks using the 20 year "Environmental Perspective". The chapter includes the results of the rating validation of the analysis.

Chapter 5 presents the conclusions and recommendations of the study. The chapter will begin with a broad overview of the entire study and conclude with some recommendations for future research.

In summary, the study selects environmental components of documents and texts, establishes the frame work for the analysis and validates the framework, and then makes an assessment.

CHAPTER 2

Significance of the Study

The four sections of this chapter argues the significance of the study. The first section will show the desirability of improving the quality of environmental education in the school system based on an analysis of current environmental events and issues. The second section demonstrates the lack of systematic evaluation of Ministry material for environmental content. The third section discusses the importance of curriculum evaluation. The chapter closes with a literature review of other environmental studies related to this study.

Environmental Awareness

The January 2nd, 1989 issue of Time picked the "Endangered Earth" as "Planet of the Year," in lieu of its usual "Man of the Year" or "Woman of the Year". That issue summarized instances of environmental degradation that were newsworthy during 1988. The position taken by Time reflected the one taken by environmentalists. The

general view seems to be that we are passing through a period of biological, environmental, and cultural evolution unmatched in the history of the earth, and that whole environments are being altered to the extent that living things and societies that have evolved over thousands of years stand on the threshold of extinction. To the environmentalists, people are placing excessive demands on the limited resources of our planet while nations spend over one billion dollars a day on defense. For the first time in history, people are discovering the deteriorating quality of their lives due to pollution in the water, in the food they eat, and in the air they breathe.

Education presents a possible avenue for resolving these environmental problems. David Suzuki as television host of "The Nature of Things," is constantly reminding his audiences that, if we are to survive as a species, we must take stock of the situation and make successful choices. He argues that the choices we make will define the kind of future we will experience. For Suzuki, the key is education (Porat, 1988). Improving environmental education is no guarantee that the environmental problems that exist today will be resolved. Similarly, the new AIDS education program being promoted by the Ministry of Education will not guarantee that students will protect themselves from contracting AIDS. Such reasoning does not imply that schools should not teach these programs. One program

Students Against Drunk Driving (SADD), is having great success with teenagers (Hutton, 1988). The program SADD addresses the problem of teenagers who drink and drive. Hutton states:

> The age group most likely to be in a drinking-driving crash remains those age 16 to 19. But, following the formation of SADD groups across Ontario, alcohol-related crashes for that age group went down by almost 24 percent between 1985 and 1986
> (p. 5).

There are other proponents of education using to preserve the environment. Ramsey and Rickson (1976) stated that increased environmental knowledge leads to favourable attitudes towards pollution abatement which, in turn leads to action promoting better environmental quality. The respondents for their study were 482 high school seniors from three schools in Minnesota. Orpwood and Souque (1984) state that:

> Tomorrow's citizens and decision makers are in school today -- are they receiving the education they will need in the 1990's and beyond? As the rate of change increases and the world becomes even more complex, Canadian students need more and better science education to prepare them for the future. (p. 9)

The same can be said for environmental education because it is no longer a question of Canada's survival; rather it is a global concern of deadly serious consequences.

Lack of Evaluation of Ministry Documents

The Ministry of Education's responsibilities include developing broad goals of education and specifying major objectives and expectations. Yet, searches of ERIC and ONTERIS did not identify documents that deal explicitly with environmental education as a separate component of the school curriculum. The same concern, a lack of environmental education, exists in the schools of other countries such as Australia (Greenall, 1981), the U.S.A. (Berberet, 1987), and Israel (Zoller, 1986). However, this study is novel in that it investigates the parallels between education curriculum materials and environmental knowledge and concerns.

Importance of Evaluation

Curriculum evaluation is the central theme of the study. The term "curriculum" when used broadly includes curriculum, program, and policy change. The purpose of evaluation depends on what one believes are the aims and goals of education. Sparks (1988) states that there is no simple description of curriculum evaluation that will be acceptable to everyone

because the notion of evaluation is value-laden and is therefore open to several interpretations. Concerns of the study are for the quality of curriculum materials, so curriculum evaluation is seen as an evaluation of the materials available to the learner. The orientation to curriculum evaluation makes the evaluation of texts central to the study.

Textbook evaluation is important for texts to continue to have an important place in schools. Orpwood and Souque (1984) observed that 75% of students in the middle years and 90% in the senior years use science texts in Canadian schools and that 80% of elementary teachers and 65% of high school teachers found science textbooks useful in lesson preparation. The report Science Education in Canada (1984), includes a detailed analysis of science curriculum policies across Canada and also evaluates science textbooks. The report showed that science texts are still one of the principal ways of reaching the aims of science curricula.

Analysis of texts has been used for a variety of purposes. Pratt (1972) developed a system for determining ethnic bias in texts. To obtain an accurate description of attitudinal content of textbooks, Pratt (1972) developed an instrument, ECO Analysis. Using this instrument, it is possible to describe and compare the attitudes expressed in textbooks on a quantitative basis (Pratt, 1972). Kilbourn (1984) analyzed biology texts for their epistemological

orientation to biological explanation. Spender (1982) has demonstrated the presence of sexism in texts. In 1975 the Federation of Women Teachers' Association of Ontario had grade 4, 5 & 6 readers analyzed for positive-image and non-sexist teaching messages. The assessment included counts of female and male adults and children, both as fictional and non fictional characters. The study showed that men are predominant and receive up to 80% of the coverage. In 1987 the Federation repeated the study and concluded in the new document, The More Things Change the More They Stay the Same (Batcher, Winter and Wright, 1987), that very little had changed since 1975.

Analysis of textbooks is important for research has shown that the use of textbooks by students, which are authorized by the Ministry of Education, is one of the principal ways in which the aims of programs are implemented (Orpwood & Souque, 1984). Textbooks generally follow Ministry curriculum guidelines and therefore can be seen as reflecting the views and policies of the Ministry of Education. The analysis of textbooks becomes a way to determine the Ministry of Education's perspective on environmental education.

Related Studies

Very little Canadian research exists on environmental education itself. Much of the literature dealing with environmental education is found in the American Journal of Environmental Education. Examples are: "A Public's Environmental Information Source and Evaluation of Mass Media" (Ostman & Parker, 1986), which reports the influence of the media on the public; "Students' knowledge and Beliefs Concerning Environmental Issues in Four Countries" (Blum, 1987), which shows how little knowledge students have of environmental issues; and "Bringing Global Education to the University and Community" (Edmisten, 1985), which describes the introduction of a new course of environmental education. The only research on the influence of government involvement on environmental education is Greenall (1981). Her study discusses how the Australian Labour Government, elected in 1972, introduced environmental education to the school curriculum. Wilke (1985) stated that in Wisconsin, before teachers can be licensed, they must pass a specific competency test in environmental education. This compulsory qualification came about not as a directive from the government but as a directive from the Wisconsin Association for Environmental Education.

The review of the literature shows that research on environmental education is scarce. More importantly, the

literature contains no studies of the appropriateness of environmental education curriculum material in terms of environmental concerns, as expressed in the media and other publications. This study will therefore contribute to existing knowledge of the suitability of curriculum documents for environmental education.

CHAPTER 3

Method

This chapter describes the materials that were analyzed and then evaluated in the study, and the methods used to achieve the analysis. The chapter begins with an account of the materials used in the study and of how they were identified. The second section of the chapter describes the development of the" Environmental Perspective" used as the basis for the analytical schemes. These schemes and their application are explained in the third and fourth sections. Examples of the analysis using these schemes are given in these sections, together with an account of how the resulting analysis is presented. The chapter concludes with a section describing how the rating validation of the analysis was conducted. The full analysis for each document is appended.

The Documents Studied

Two types of documents were identified for study: documents published by the Ministry of Education for the Province of Ontario, and textbooks sanctioned by the Ministry for use in the Province of Ontario. These documents and the methods used to identify them are described below.

Documents Published by the Ministry

The Ministry documents selected for analysis pertain to the areas of geography and science. Both subjects deal extensively with environmental issues. New curriculum documents for both geography and science are in the process of being introduced in the schools of Ontario. If past practice continues, the majority of these documents will be in use for the next ten to fifteen years. For the scope of this study, the curriculum documents analyzed are the intermediate years (grades 7-10), the senior years (grade 11, 12), and the OAC's. New curriculum documents exist for these grades at the basic, general, and advanced levels. A total of 22 documents were analyzed, including the OSIS document, the complete set of six geography documents, and the complete set of 15 science documents. The OSIS document is included in the analysis because it outlines the Ministry of Education expectations from grades 7 and up

to the OAC's in the schools of the province of Ontario. The OSIS document states the Ministry's policies on a variety of topics such as evaluation, guidance, co-operative education, and multiculturalism. Evaluating the OSIS document for environmental content was considered as a possible indicator of the emphasis that the Ministry places on the environment.

All 22 documents were obtained from the Ministry of Education and are listed in Appendix B. All the documents outline curriculum for a specific grade level with the exception of the OSIS document and the introductory documents Science Part 1 and Geography Parts A and B. The format of the science documents differ from the geography documents. Each science curriculum document contains eight different components ranging from objectives to teaching suggestions and includes much science content. The opposite is true for the geography curriculum documents; they prescribe very little geography content but emphasize descriptions of cognitive knowledge, skills, and attitudinal objectives.

Sanctioned Textbooks

The Ministry textbooks selected for analysis are in the subjects of science and geography, grades 7-OAC's. All the texts are listed in Circular 14 Textbooks (Ontario Ministry of Education, 1989) which is the annual

publication that provides a list of texts approved by the Minister of Education for use in Ontario schools. Circular 14 has been in effect since 1889, and is updated annually.

Texts to be eligible for evaluation for Circular 14 must meet a whole list of criteria ranging from Canadian ownership to containing accurate content that is of contemporary relevance. But most important the materials must be consistent with one or more curriculum guidelines developed by the Ministry of Education and support a substantial part thereof. A publisher who wishes to have a book considered for Circular 14 must submit nine copies of the text to the Learning Materials Unit of the Ministry of Education. If the submission is eligible for evaluation, the ministry then sends a copy to each of several evaluators for comments and recommendations.

The introductory page of Appendix C states the name of each text, grade, course code, and recommended level. Two new science textbooks, that have been approved by the Ministry are not yet listed in Circular 14 but are included in the analysis. The science and geography texts in Circular 14 are divided into two sections; a pre 1980 date and a 1987 or 1988 date. All texts listed in the second list are either new publications or a revised edition. One geography text used in the Intermediate division is listed under the pre 1980 section of Circular 14 but a 2nd edition has been published which has been approved by the Ministry

and should be included under the new listing. All the texts analyzed are in use in the schools of The Leeds & Grenville County Board of Education and were obtained from the local elementary and high schools. With the implementation of the new geography and science OSIS curriculum, it is the policy of the Leeds & Grenville County School Board that the same textbook be selected for each course in all the schools. For example all students enrolled in the GWIOA1 course use the text World Prospects: A Contemporary Study (2nd ed.). Science and geography teachers in most instances, therefore, are selecting new textbooks which correspond to the new curriculum documents. Table 1 shows the number of texts available for each grade level from the Circular 14 second selection list. In many instances a choice had to be made in selecting which text to analyze; in total 24 texts are analyzed out of a possible 66 texts. The selection for most was made by using the textbooks that are in use at South Grenville District High School, a school in the Leeds and Grenville School Board. If the school used more than one text, the text with the newest publication date was selected. Since few texts are written for basic level students, most of the texts analyzed are for general and advanced level students.

Table 1
List of geography and science textbooks, per grade, available and analyzed from Circular 14

DATE	SUBJECT	GRADE	# OF TEXTS AVAILABLE	# OF TEXTS ANALYZED
1988	geography	7	1	1
	geography	8	4	1
	geography	10	6*	3
	geography	senior	4	2
	geography	OAC	2	2
1987	science	7	4	2
	science	8	2	2
	science	9	6	2
	science	10	6	2
1987	biology	11	8	1
	chemistry	12	7	2
1988	physics	11	4	2
1987	biology	OAC	4	1
	chemistry	OAC	8	1
1988	physics	OAC	2	1
		TOTAL or 36%	66	24

*includes one text not yet listed under new selection list.

Development of the Environmental Perspective

An initial task in the thesis was the development of the "Environmental Perspective." The intention was to use reliable sources to list environmental knowledge and events, such as major accidents, by year so that the adequacy of environmental content presented in the documents could be assessed. Quite clearly, the validity of the "Environmental Perspective" is crucial to the validity of the entire study. This section of the present chapter describes in detail how the "Environmental Perspective" was developed, beginning with the time-frame selected, and the categories and the subcategories of the Perspective. Attention is given here to the sources used to compile the "Environmental Perspective" for each of the years chosen. The section concludes with an example: the "Environmental Perspective" for 1980. The completed" Environmental Perspective" is presented in Appendix A, by year.

Time-frame and Categories

Environmental information extends back in time for a considerable number of years. So the objective of providing an "Environmental Perspective" for each year had to be limited in this study by selecting a specific time-frame. There is evidence from the acclaim received by such books as Pollution Probe (Chant, 1970), The Closing Circle:

Nature, Man and Technology. (Commoner, 1971), and The Limits of Growth (Meadows, 1972) that popular concern for the environment has its origin in the last twenty years. For this reason, the "Environmental Perspective" is developed for each of the years 1970-1989 inclusive.

The three major categories for the "Environmental Perspective" are devised from the four major threats to the earth's environment identified by Time Magazine in its January 2, 1989 issue: extinction, global warming, waste, and overpopulation (pp. 54-55). Overpopulation is inconsistent with the definition of environment used in this study as defined in chapter two. Accordingly, the three categories used were extinction, global warming, and waste.

It was decided that the "Environmental Perspective" for each year should be arranged so that it would provide contemporary environmental information that could be used to assess the adequacy of the documents and, at the same time, be sufficiently compact and manageable to be used in the analysis. Three subcategories were chosen for each major category: publication, event, and knowledge (Figure 1). These are described in order below.

Nearly all the publications documented are from the author's own library. A publication is presented, if one existed, for every year for all three categories. A publication does not exist every year for the category of

Environmental Perspective for 19

Extinction

Publication

Event

Knowledge

Global Warming

Publication

Event

Knowledge

Waste

Publication

Event

Knowledge

Figure 1: Development of the Environmental Perspective

"global warming." The threat of global warming has become a major issue since the mid 1980's and, as a result, several new publications appeared in 1989. The publication that is listed for each of the categories may not deal entirely with the issue of "extinction," "global warming," or "waste," but the general theme of the book or portions of the book examine the particular category.

The subcategory of "event" in most cases states an occurrence of an environmental issue such as an important environmental conference, government legislation or the creation of a new environmental group. The event for 1970, for example, was the first "Earth Day," April 22. All the data for the subcategory "event" and "knowledge," with the exception for 1989, were obtained from The American Annual an encyclopedia yearbook of the Encyclopedia Americana. A concise summary of environmental events and issues is found in each yearbook. For the 1970 yearbook, environmental events are labelled under the heading "Ecology," from 1971 onward however, the title has been changed to "Environment." The annual yearbook for the year 1989 was not available. The data for 1989 come from Time (2 January, 1989). In many instances the data for "event" are presented as quotations from the yearbook, showing that the "Environmental Perspective" is based on precise data from the encyclopedia.

In a similar manner, the data for the third subcategory "knowledge" was obtained from The American Annual and also presented as quotations from the yearbook. The subcategory of "knowledge" states some information that occurred in a particular year. In 1980, for example, American industry generated more that 96,000,000,000 lbs. of hazardous waste. Moreover, on 28 March, 1979, the Three Mile Island nuclear power plant experienced a partial melt down.

Environmental Perspective Example for 1980

The following is an example of how the "Environmental Perspective" is developed, in this case for 1980 as shown in Appendix A. The three publications Entropy: A New World View, The Greenhouse Effect, and Acid Rain: The Silent Crisis present a good overview of the major environmental concerns for 1980. The energy crisis is still a major concern and the publication Entropy: A New World View explains the Second Law of Thermodynamics from an energy perspective. The book outlines the outcome for future generations if energy is not used more wisely. Rifkin writes:

> American agricultural technology is extraordinarily efficient. Yet the truth is that it's the most inefficient form of farming ever devised by human kind. One farmer with an ox and plow produces a

> more efficient yield per energy expended than the giant mechanized agrifarms of modern America. (p. 136)

The Greenhouse Effect is one of the first publications presenting the alarming condition of the earth's climate. Acid Rain: The Silent Crisis is one of several publications that show the effects of acid rain on the environment.

For the other two categories "event" and "knowledge," specific environmental data are recorded for that year. A major event is the presentation of the Global 2000 Report to the American Congress. This report is significant in that it has many parallels to the Club of Rome report of 1972, The Limits to Growth. The Global 2000 Report described the continuing environmental degradation in America, and showed that from an "Environmental Perspective" not much had changed during the past ten years. The "Environmental Perspective" thus described is repeated in the same manner for the other 19 years.

The "Environmental Perspective" for each year was compiled using the sources listed above, and appears in Appendix A. This body of information provides the information used to assess the curriculum documents studied in this thesis. Each type of document was evaluated for its adequacy from an environmental view point by using an analytical scheme. The development of the scheme for Ministry documents is described in the next section.

Analytical Scheme for Ministry Documents

The analytical scheme for Ministry documents was designed to guide the analysis of each document for its presentation of environmental information and to provide this information in a brief and accessible fashion so that it would be appended to the thesis itself. (The completed analytical scheme for each document appears in Appendix B). The analytical scheme (figure 2) for Ministry documents is described below.

The analytical scheme begins with the publication details. These are followed by the stated policy of the document. The definition of "policy" used in this thesis is deliberately broad. Generally the term refers to guidelines for decision making, or to an overall strategy, plan, or purpose. In most cases, the "policy" is global in intent and its purpose is to improve organization and effectiveness, reflect personal values, and clarify confusion within an organization. Holdaway (1983), Yeakey (1983), and Guba (1984) define "policy" differently. Guba (1984) provides eight definitions. One states: "policy is a governing body's standing decisions by which it regulates, controls, promotes, services and otherwise influences matters within its sphere of authority," and it suits the purpose of this research paper. A broader view

Ministry Document #

Publications Details

Stated Policy

Environmental Statements: Quantitative

Term "environment" used:
Number of pages:
Environmental issues:

Environmental Statements: Qualitative

Environmental perspective: 19

Evaluation.

Summary Assessment

Evaluation.

Figure 2: Analytical scheme for Ministry Documents

of the term is reflected in the analytical scheme to allow for a record of the direction the Ministry has set for the document.

"Quantitative environmental statements" has three categories for recording numerical information. The first records how often the term "environment" is used in the document. The second category lists the number of pages dealing with environmental issues and the third category expresses the number of environmental issues discussed in the document. A simple method of highlighting all the different environmental data in each document was used. The data were counted and the numbers recorded for these provide an indication of the importance the document attaches to the environment.

Items under "Qualitative environmental statements" are quotations from the documents which have been identified from the above. The number of quotations vary from one to four and were chosen at the author's discretion to best illustrate the document's environmental view point. Each quotation expresses a different environmental issue or view. Each quotation is matched with the date of a publication taken from the "Environmental Perspective." If the quotation deals with acid rain for example the date 1980 is listed, for the publication <u>Acid Rain: The Silent Crisis</u> was published that year.

In the next part of the analytical scheme each environmental statement is evaluated as either being correct or incorrect, adequate or inadequate, and impartial or partial. The evaluation is based on information in the "Environmental Perspective" which reflects a concern for the delicate ecological balance of the earth's biosphere as upheld by most environmentalists. The statement is judged correct or incorrect according to technical and scientific knowledge present in the "Environmental Perspective." Judging a statement as adequate or inadequate is determined by the wording of the statement. Environmental statements which include words like "may," "often," "possible," or "carefully," might technically be correct and adequate but from an environmentalist point of view become inadequate. Judging a statement impartial or partial is also determined by the wording of the statement to see if any biases exist toward a certain point of view. In Ministry Document #9 (Appendix B), for example the second qualitative statement states "Many new crop varieties have little resistance to some pests. Consequently pesticides often have to be used for these plants." (p. 46) This statement is correct scientifically but, from an environmental perspective, it is inadequate and partial for most environmentalists do not adhere to the view that large scale use of pesticides is a viable solution to growing food. The statement is saying that the only way new crops can be introduced is with the

aid of pesticides and this is not necessarily so. The statement in its support of pesticides favours large chemical companies rather than supporting a solution that will not pollute the earth.

A summary assessment is presented for the document. The document is evaluated first to see whether the environmental content is either consistent or inconsistent with the "Environmental Perspective." If the majority of the environmental statements from the document are based upon the concern for the delicate ecological balance of the earth's biosphere, it is evaluated as consistent with the "Environmental Perspective." Otherwise it is evaluated as "inconsistent with the environmental perspective."

A short summary of the document explains how much or how little environmental content exists. Some documents, according to the quantitative data, seem to have a large amount of environmental content but this can be very misleading, for much of that environmental content may be found in only one or two chapters. Thus the summary presents a broad environmental overview of the document based on both the quantitative and qualitative statements.

Example of an Analytical Scheme for Ministry Documents

The Ministry document #11 (Appendix B), Science: Intermediate and Senior Divisions, Applied Physics and Technological Science, Grade 12, General Level, Part 10 is

used as an example of how the documents are analyzed. The analysis starts with the full name of the document which is followed by the policy statement. The document does not clearly identify the policy. Using the broad definition of "policy" as defined earlier in this chapter, policy statements have been drawn from the document, but only with great difficulty. Three categories provide information for the "Quantitative Environmental Statements." For example the term "environment" is used four times in the document, while 28 different environmental issues are found on 13 pages.

Three qualitative environmental statements are recorded from the 28 environmental issues present in the document. The three statements chosen all deal with energy but from different perspectives and are then matched with publications from the "Environmental Perspective." For example, the third statement "The nuclear industry has created situations in which the risks and benefits must be carefully examined and evaluated," (p. 30) is matched with the publication, Nuclear Energy: The Unforgiving Technology (1976). Next, the three statements are evaluated from an "Environmental Perspective." All the statements are technically "correct," but from an "Environmental Perspective" they are "inadequate." For example, environmentalists believe that thermal pollution is a concern everywhere, that conservation must take place

and not be subject to debate, and that nuclear power does not need to be examined and evaluated but must be stopped completely. The last two statements are evaluated as impartial. The second statement "A number of issues involved with the conservation, production, and distribution of electrical energy are subject to public debate" (p. 22) questions the concept of "conservation" thereby promoting electrical growth as is the policy of Ontario Hydro. The third statement makes it appear that nuclear power has benefits which is the view held by Ontario Hydro, Atomic Energy of Canada Limited (AECL) and Atomic Energy Control Board (AECB) making the statement completely partial towards the nuclear industry.

The "summary assessment" of the document states that the document is for the grade 11 general level physics and technological science courses. The summary also states that environmental content was not prevalent in the document and that some of the environmental content was presented from the nuclear industry's point of view. Accordingly, the document is evaluated as inconsistent with the "Environmental Perspective." Twenty-one other documents are analyzed in this manner for their environmental content, and the results appear in Appendix B.

Analytical Scheme for Textbooks

The analytical scheme for Ministry approved textbooks was designed to guide the evaluation of each text for its presentation of environmental information and to provide this information in a brief and accessible fashion so that it could be appended in the thesis itself. (The complete analytical scheme for each textbook appears in Appendix C). The analytical scheme for Ministry approved texts is described below.

Figure 3 shows the analytical scheme. The scheme begins with the publication details of the textbook and is followed by the text's stated or implied purpose. As often as possible, direct quotations are used in presenting the purpose of the text. If the author is not explicit in stating the specific purpose of the text, an implied purpose is presented. The quantitative environmental statement has three categories. The first category gives the number of pages that mention environmental issues. (If more than one environmental issue is presented on a page, it is still only counted as one issue). The second category states the number of chapters that include environmental issues; the third category lists the number of illustrations that deal with environmental issues. All three categories are presented in numerical form, thereby indicating the relative importance of environmental

Text Book #

Publication Details

Stated or Implied Purpose

Environmental Statements: Quantitative

Number of pages:
Number of chapters:
Number of illustrations:

Environmental Statements: Qualitative

Extinction

Environmental perspective: 19

Evaluation.

Global Warming

Environmental perspective: 19

Evaluation

Waste.

Environmental perspective: 19

Evaluation

Summary Assessment

Evaluation

Figure 3: Analytical Scheme for Ministry textbooks

concerns. Figure 4 shows how the data is collected for each textbook.

The qualitative environmental statements are divided into the three world threats that appear as categories in the "Environmental Perspective": extinction, global warming, and waste. Examples of such threats are presented as two to four quotations from the text. Each of the qualitative environmental statements is compared to a publication from the "Environmental Perspective" and evaluated in the same manner as the Ministry documents described previously.

The "summary assessment" is a short summary of the environmental content of the textbook. The quantitative data may indicate a large number of environmental issues present throughout the text. In most texts, however the environmental issues are present in only one or two chapters. The text is also evaluated in terms of its consistency with the "Environmental Perspective." Evaluating the complete text as consistent or inconsistent is not possible, for texts present a variety of points of view. Instead, each of the environmental statements of the three threats, "extinction," "global warming," and "waste," are evaluated separately for their consistency.

Title of Text

A. Environmental Issues - (Page numbers)

Chapter 1
2
3
4
5
6

B. Illustrations - (Page numbers)

C. Environmental Statements - (Page numbers)

(i) Extinction
(ii) Global Warming
(iii) Waste - (include type of waste)

D. Purpose of text - (Page number)

E. Other interesting data - (Page number)

Figure 4: Method used for collecting data for textbooks

Example of an Analytical Scheme for a Textbook

In this section, an example is given of how the analytical scheme for Ministry approved texts is used. The text is Focus on Science 8 (Textbook #12, in Appendix C) and its purpose is to help students become more aware of science and the impact science has on their lives. Quantitatively, only 24 of 395 pages deal with environmental issues. These issues are evenly presented for they are found in six out of the seven chapters in the text. The text has 18 illustrations that deal with an environmental issue.

Seven qualitative environmental statements are selected from the text. The two environmental statements that can be applied to the topic of "extinction" deal with pollution and its danger to certain animal and plant species. These statements are correct, adequate, and are presented in an impartial way. The first statement is matched with the publication State of the World 1989, a report written by the World Watch Institute. The second statement is also matched with a report written by The World Watch Institute, Laying Waste: The Poisoning of America by Toxic Chemicals (1979). The two environmental statements presented under the category of "Global Warming" are evaluated as correct, adequate, and impartial. These two statements are matched with publications in 1970, The Environmental Handbook, and 1974, Small is Beautiful: A

Study of Economics as if People Mattered. (E.F. Schumacher) In this publication, Schumacher presents an alternative view that technology does not necessarily have to harm the environment.

The environmental statements for "waste" explore three different topics: incineration of wastes, nuclear power, and toxic chemicals. The three statements are matched with publications from the "Environmental Perspective" as Chemical Nightmare: The Unnecessary Legacy of Toxic Wastes (1982), Nuclear Energy: The Unforgiving Technology (1976), and Pollution Probe (1970) respectively. In evaluating the three statements, only the third statement "The result is a steady accumulation of toxic substances in a variety of environments that endanger both wildlife and human population" (p. 347) is considered as correct, adequate, and impartial. The first two statements are both incorrect, inadequate, and partial. Statement number one "One of the most effective treatments for hazardous waste is incineration" (p. 113) is incorrect. Incinerating toxic waste releases dioxins and furans into the atmosphere and also produces a highly toxic ash. In a similar manner, the second statement "The CANDU reactor has power to be very reliable and safe to operate" (p. 249) shows support of nuclear power which is the most inefficient way to produce electricity for it is expensive, dangerous, and

produces plutonium waste which is radioactive for 250,000 years.

The "summary assessment" for the textbook is brief for the text does not have much environmental content. The evaluation for both "extinction" and "global warming" are consistent with the "Environmental Perspective". The publication's statements on incineration of toxic wastes and nuclear power, however, are inconsistent with the "Environmental Perspective" under the topic "waste."

Rating Validation

The problem of internal reliability in this study is crucial and is addressed by a rater validation which validates the analytical framework and its use by the author. A brief description of the study, the "Environmental Perspective" and the analytical schemes were presented to three individuals: a geography teacher, a science department head, and an environmentalist. Each individual received a Ministry document, one or two texts, and a form (Figure 4); and each was asked to analyze the materials. The completed analytical scheme from the three individuals appears in Appendix D. Each of the Ministry documents and textbooks are numbered the same as in Appendix B and C, making comparison of the data simple. The results are discussed in chapter four.

Summary

This chapter has described the materials that were analyzed and the means by which the analyses were accomplished. Included are the three different schemes used in the analysis. All the data collected for the three schemes and the data that provides the "Environmental Perspective" are included in this study as appendices.

CHAPTER 4

Results

This chapter presents the results of the analysis of Ministry documents and textbooks using the 20 year "Environmental Perspective" developed for this study. The chapter begins with the results of the rating validation of the analysis.

Rating Validation

The results of the determination of the rating validation of the analytical scheme are presented in two parts: Ministry documents and textbooks. The three individuals analyzed the Ministry documents and textbooks for "environmental statements: quantitative," "environmental statements: qualitative," evaluation of these statements, and a "summary assessment". Their findings are numbered in the same manner as the research data and are presented in Appendix D.

Ministry Documents

A comparison of Ministry documents 14, 15, and 19 in Appendix D shows that the three individuals' analyses of the documents are similar and that they concur with the author's analysis presented in Appendix B. Only the quantitative environmental statements of Appendix D can be compared to the author's analysis. Goetz and LeCompte (1984) state:

> Thus, because they rarely rate or code phenomena enumeratively, the agreement ethnographers seek is more appropriately designated interobserver reliability. What is sought is agreement on the description or composition of events rather than on the frequency of occurrence of events. (p. 218)

The frequency counts of the quantitative environmental statements vary slightly between the three individuals and the author. For example, Document 14 presents 28 environmental issues compared to 21 issues for the author, while Document 15 and 19 in Appendix D present 21 and 20 environmental issues respectively compared to the author's counts of 29 and 25 respectively.

The qualitative environmental statements in Appendix D and the author's match closely. Appendix D presents a great variety of environmental statements, ranging in topics from radioactive material, chemical contamination,

and the hazards of power lines. The same topics are presented variously in Appendix B. The evaluation (based on correct and incorrect, adequate and inadequate, and partial and impartial statements) varies somewhat with each document in Appendix D, as with the author's. All three individuals shared similar concerns regarding each document's environmental statements. In all three documents the individuals recorded qualitative statements that were found to be both inadequate and partial. Similarly, in the "summary assessment," all three individuals agreed fundamentally with the author of this study, alluding to environmental content that perhaps could have been included in the document but was not.

Textbooks

The three individuals' analysis of the four textbooks in Appendix D produced the same results as the author's analysis of the textbooks. The numbers for the quantitative environmental statements, however, are somewhat lower than those of the author. This is especially true for the "illustration" numbers. Textbooks contain a good deal more content than Ministry documents, making it easier to omit some data. Appendix C presents a variety of environmental qualitative statements, ranging in topics from extinction of caribou, water pollution, and the greenhouse effect. The author examined many of the same

environmental issues as the individuals, but lists more examples of them, especially in the "waste" category. Textbook 20 and 21 in Appendix C, for example lack information on global warming which was also rated in the author's analysis. The three individuals evaluated the qualitative environmental statements in the same manner as the author: the categories of "extinction" and "global warming" were interpreted as either correct, adequate or impartial. The author and the individuals agree that a number of qualitative environmental statements under the category of "waste" are both inadequate and partial. The three individuals concur with each other, confirm the author's analysis, and demonstrate the usefulness of the analytical framework.

Ministry Documents

This section presents the results of the author's analysis of Ministry Documents. The results of the 22 documents analyzed are presented in four categories, as shown in Figure 2, but the publication details are omitted. In each category the results are described and interpreted.

Stated Policy

The term "policy," as defined in chapter three, is treated differently in all three types of documents

published by the Ministry of Education: OSIS, science curriculum guidelines, and geography curriculum guidelines. For example, the OSIS document states the document's broad policy at the very beginning, and then states specific policies on guidance, co-operative education, and multiculturalism throughout the document. Nowhere does the OSIS document mention a policy on the environment. The science curriculum guideline document Program Outlines and Policy: Part 1, contains a whole chapter describing the overall policy for all the science courses. These policies are presented in point form in the other 14 science documents. Relevant to the present study is the finding that not one policy statement deals with the environment. The 14 science documents which are concerned with curriculum also lack clear policy statements, even though a stated policy statement is presented in Appendix B. A total of 26 different science courses are described in the documents; not one of them contains a stated environmental policy.

The geography documents are completely lacking in clear and concise policy statements. No direct policy statment is presented in any of the documents, not even in the document entitled Policy and Program Expectations. The policy statements presented in Appendix B are selected according to the broad definition of "policy" used in chapter three. As in the OSIS and science documents, no

environmental policy statement exists in the geography documents.

Environmental Statements: Quantitative

The "quantitative environmental statement" data are presented in numerical form and are summarized in Table 2. This table lists all of the Ministry documents analyzed in this study and summarizes all the numerical data. All the documents present some environmental data, ranging from a high of 56 to a low of 2, making it appear that nearly every document discusses the environment. What Table 2 does not show is that much of the environmental data exist often only in one or two curriculum units described by the document, and that in some instances these are optional units. Also, all the documents deal with more than one grade or more than one curriculum, and in five instances only one of the curriculum guidelines has any environmental content in it. For example, in Ministry Document #15 very little environmental content exists in the OAC Chemistry curriculum.

All the units of the science curriculum documents consist of eight components ranging from "objectives" to "some teaching suggestions." Most of the environmental issues are found in the components of "society implications," "possible extensions," and "some teaching suggestions." The latter two components are not mandatory

Table 2
Environmental Statements: Quantitative

Ministry Documents

Document	Category 1 No. of times environment used	Category 2 No. of pages %	Category 3 Environmental Issues
1. OSIS	2	6	1
2. Science Introd.	21	18	20
3. Grades 7-8	13	45	47
4. Grades 9-10 Gen.	31	46	62
5. Grades 9-10 Adv.	23	39	55
6. Grades 9-10 Basic	4	23	13
7. Grades 11-12 Basic	20	29	33
8. Env. Science 10-12 General	19	48	135
9. Env. Science 10-12 Advanced	27	50	103
10. Biology & Chemistry 11 General	21	31	59
11. Physics & Techn. 12 General	4	22	28
12. Geolog. 12 Gen. & Advanced	10	24	8
13. Biology 11 & OAC-Advanced	19	20	21
14. Chem. 11 & OAC-Advanced	13	32	21
15. Phys. 12 & OAC-Advancaed	7	21	29
16. Sci. in Society OAC	21	78	8
17. Geog-Introd-Policy	13	16	3
18. Geog-Introd-Planning	2	6	1
19. Intermediate	14	23	25
20. Senior	12	25	18
21. Senior	56	50	37
22. OAC	32	50	24
Average	17	32	34

parts of the unit of study while the component "societal implications" is intended to be used only as a guide to examples and is not intended to be taught in great detail. The number of "environmental issues" decline in the senior science documents, especially at the OAC level. The four OAC science documents, for example, contain environmental issues ranging in number from 8 to 29. This number is low in comparison to a range of 47 to 55 for grades 7 to 10.

The environmental data in the geography documents are fairly consistent ranging in number of environmental issues from 18 to 37. The only reason why Part E: The Senior Division Program has a greater number of environmental issues than the average is that the document includes the "Environmental Studies" curriculum. In general, the geography documents lack environmental issues.

Environmental Statements: Qualitative

A summary of the evaluation of the "qualitative statements" is presented in Table 3. It is not unreasonable to expect that environmental content in Ministry documents be correct, adequate, and impartial; however this is not the case. Of the 49 qualitative statements evaluated, 44 are correct; five incorrect statements were found in the science documents. For example, the statement in Ministry Document #4 "The long-term effect on the ecosystems of the use of chemicals in

Table 3
Summary of Evaluations for the Qualitative Environmental Statements and Summary Assessment

Ministry Documents Evaluations

Qualitative Statements

	Documents		
	OSIS	Science	Geography
Correct	1	30	13
Incorrect		5	0
Adequate	1	13	10
Inadequate		22	3
Impartial	1	14	13
Partial		21	0

Summary Assessment

Consistent with env. perspective	1	6	6
Inconsistent with Env. perspective	0	9	0

new pesticides and herbicides is not yet fully known" (p. 31) is incorrect. Based on the "Environmental Perspective for 1971," publication The Closing Circle: Nature, Man and Technology. Commoner states "in general, any productive activity which introduces substances foreign to the natural environment runs a considerable risk of polluting it" (p. 124).

Just over one half of all the qualitative environmental statements are evaluated as inadequate. Most of these are found in the science documents. It is impossible to refer to all 25 inadequate statements to explain why they are inadequate, but three examples are given as illustrations: First, Ministry Document #4 states that the effects of new pesticides and herbicides is not yet fully known. Second, Ministry Document #6 states that salt on roads may cause extensive damage to cars and roads, while it is well known that salt causes extensive damage. Third, Ministry Document #17 states that teachers must make it clear to students that for many issues there is no single or simple solution. This statement is incorrect for most issues do have a simple solution. The provincial government, for example, has in its power the ability to legislate a new building code, necessitating the construction of energy efficient homes. Canada is a world leader in the design of energy efficient houses, yet the average Canadian home uses a wasteful 40, 000 kilowatt-

hours of energy a year. The energy efficient R-2000 house, for example, is much more efficient as it consumes only 25,000 kwh per year. The high performance homes, such as the Ontario Advanced House demonstration project in Brampton, use only 10,500 kwh per year. Canadians use more energy per capita than any other people in the world; the house is the third largest user of energy, using 18% of all energy consumed (Pollution Probe, 1989). Homes, primarily rely on fossil fuels for heating energy; they thus continue to be major sources of pollution, releasing many tonnes of carbon dioxide into the atmosphere every day.

Table 3 shows that no partial statements were found in the geography documents. All of the 21 "impartial" statements were found in the science documents. In most instances, if a statement is evaluated as inadequate it is also evaluated as partial. Many statements are inadequate and partial simply because they lack input from environmentalists and environmental groups. Nearly all of the names listed in the "Acknowledgements" of both the geography and science curricula are either those of school boards or academics from universities or colleges. For example, the science documents acknowledge Ministry of Education personnel, 73 school boards, 38 universities and colleges, and 3 museums. No environmental groups were acknowledged in either the science or geography documents. Throughout all the documents, reference is often made to

industries or governmental agencies as resources and only twice was it suggested that an environmental group be approached. (Document #15 mentions on page 18 the name "Pollution Probe.") The science documents all promote the idea that science has been a benefactor to our way of life today, with no attention given to the actual or potential damage its products have on the environment. All the documents stress that there are always benefits and risks and that society must chose and live with some risks. The best example is the topic nuclear power. Not one document opposes nuclear power, or expresses any serious concerns about this energy source. Radioactive nuclear waste is a deadly substance. It is invisible: one can neither smell nor taste it, and one curie of it will kill a person. Barlett and Steele (1985) state, "No one knows how much there is. No one knows all the places where it is. And no one despite all claims to the contrary knows what to do with it." (p. 20)

Summary Assessment

The "summary assessment" is an overview of how much environmental content exists in each document and an evaluation which is presented in Table 3. The table shows that six geography and six science documents were evaluated as consistent with the environmental perspective. Nine science documents were evaluated as inconsistent with the

environmental perspective. These other documents do little to stress the concern for the delicate ecological balance of the earth's biosphere. The "summary assessment" states how little environmental content exists in the core and optional units of the aforementioned curriculum guidelines. Many of these units could have included some environmental content as was the case in the grade 9 and 10 basic level science course or the geology course. With the exception of the three environmental curriculum courses, environmental issues are not afforded a high priority in Ministry documents.

Textbooks

The results of the analysis of 24 textbooks is presented in the same four categories as above. The results are described and interpreted for each category.

Stated or Implied Purpose

Using the data provided in Appendix C, only textbook #9 used the word "purpose" in describing the "stated or implied purpose." Three geography textbooks do not present an implied purpose. Textbooks 7, 8, 11, 13, 14, 19, and 20 do not state a clear purpose, and, therefore, an "implied purpose" is presented. The remainder of the textbooks use a variety of words such as "examine," "strived," "intent,"

and "function" to describe the purpose of the text. The textbooks analyzed in this study are remiss in stating the specific purpose of a text.

Environmental Statements: Quantitative

The "quantitative environmental statement" data is presented in numerical form and is summarized in Table 4. With the exception of one biology text, all the textbooks present some environmental data but a great variety exists. In general, geography texts do not contain a lot of environmental content, for six of the nine texts, only 1-5% of their pages deal with environmental issues. Textbook #9 is an exception for this text deals entirely with world issues. In three instances, the data show that great inconsistency exists between texts used for the same curriculum, as is the case for the three grade 9/10 Canadian geography texts, the two OAC geography texts, and the two grade 11 chemistry texts. As with Ministry documents, the senior texts (grade 11 to OAC), with the exception of #9, all present less environmental data than the intermediate texts (grade 7 to 10). Several of the senior science texts especially physics and chemistry contain very little environmental content. The number of environmental illustrations varies from a low of 0 to a high of 50. No correlation exists between the number of pages in a text which deal with environmental issues and

Table 4
Environmental Statments: Quantitative

Textbooks

Textbook/ grade	#of pages%	#of chapters%	#of illustrations
1. Geography 7	5	33	15
2. Geography 8	5	67	9
3. Geography 9/10	13	21	31
4. Geography 9/10	12	80	30
5. Geography 9/10	5	24	17
6. Geography 11/12	3	50	6
7. Geography 11/12	2	29	4
8. Geography OAC	1	21	2
9. Geography OAC	33	50	30
10. Science 7	9	71	37
11. Science 7	8	50	33
12. Science 8	6	8	19
13. Science 8	9	83	33
14. Science 9	4	37	16
15. Science 9	6	29	13
16. Chemistry 10	14	52	50
17. Chemistry 11	4	25	21
18. Chemistry 11	9	61	23
19. Biology 11	0	0	0
20. Physics 12	2	8	0
21. Physics 12	7	13	46
22. Physics OAC	1	5	1
23. Chemistry OAC	3	40	35
24. Biology OAC	7	43	18
Average	7%	38%	20

the number of illustrations. The number of illustrations in a textbook depends on what topics are presented: some issues, such as energy, oil spills, and water pollution, can be explained more easily through the use of illustrations than others, such as toxic chemicals. Records of the number of textual illustrations that deal with environmental issues show that most authors employ this visual media, but do so in varying degrees.

Environmental Statements: Qualitative

A summary of the evaluation of the "qualitative statements" is presented in Table 5. The "qualitative statements" are divided into three categories: extinction, global warming, and waste. The results for each category are presented separately.

The analysis of the textbooks led to just 30 environmental statements being classified under "extinction." Many of the texts did not include the topic of extinction in great detail, and seven books did not discuss the topic at all. The texts that included extinction issues presented them in most instances in ways judged as correct, adequate, and impartial. This would imply that most authors are concerned about the threat of extinction of different species or the threat of nuclear war.

Table 5
Summary of Evaluations for the Qualitative Environmental Statements and Summary Assessment

Ministry Textbooks Evaluations

Qualitative Statements

	Categories		
	Extinction	Global Warming	Waste
Correct	29	20	36
Incorrect	1	2	17
Adequate	29	16	20
Inadequate	1	6	33
Impartial	28	15	19
Partial	2	7	34
Summary Assessment			
Consistent with environmental perspective	16	15	8
Inconsistent with environmental perspective	0	1	13

The category of "global warming" is also not discussed in great detail in the texts. Seven texts do not include the topic of global warming; the remaining 17 texts have a total of 24 statements. The threat of global warming, if presented, generally mentioned the term "greenhouse effect" or causes of air pollution, such as the burning of fossil fuels, or the depletion of the ozone layer. Twenty of the statements on global warming are evaluated as correct, but 13 of them are inadequate and partial. For example, the text Understanding Chemistry, which was published in 1988, states "Because freon takes several years, perhaps as long as two years, to reach the stratosphere, it is difficult to prove or disprove the effect of these compounds on the ozone layer," (p. 447) makes this statement incorrect, inadequate and partial. Given the gravity of the threat of global warming as shown in the "Environmental Perspective," it is evident that the texts analyzed in this study fail to give sufficient attention to the problem with the impartiality it deserves.

Compared to the categories of "extinction" and "global warming," the category of "waste" is presented much more comprehensively. The topics are numerous and include water pollution, toxic wastes, nuclear wastes, recycling, accidents, acid rain, pesticides, and insecticides. With this great variety and abundance of topics, it becomes possible to present three or sometimes four environmental

statements in the analytical scheme. Out of a total of 105 qualitative environmental statements presented, 53 belong to the category of "waste." The evaluation of the environmental "waste" statements finds one-half of them to be incorrect and two-thirds to be inadequate and partial. The statements that are correct, adequate, and impartial deal mainly with environmental matters that appear to have become noncontroversial, such as acid rain, water pollution, and the effects of D.D.T. The other half of the statements often deal with controversial issues such as nuclear power, chemical pesticides, food irradiation, and garbage incineration. Nearly all the textbooks propose that these controversial issues be researched and debated; therefore, these texts take no stand. More than half of the texts, support the use of food irradiation, of chemicals such as 2,4-D, of nuclear power, and of incinerators for garbage. For example, textbook #23 states, "Thus a natural extension of our technological expertise would be to similarly market food irradiation units" (p. 592), and "when pure, 2,4-D and 2,4,5-T are comparatively harmless" (p. 686). It is intriguing to think that the "Credits and Sources" in each text provide an explanation for such views because with the exception of two cases where an environmental group is cited as a source, all other cases cite government agencies (such as AECL), large industries (such as Inco), and crown corporations (such as Ontario Hydro). Text number 21,

Physics for a Modern World, for example, has 121 photo credits, but environmental groups are not included in the list. The same is true for the geography textbook number 3, Canada: Land of Diversity.

In three of the science texts, different science careers are presented but only once is "environmentalist" presented as a career. Also, many of the texts suggest that information on environmental issues may be obtained by writing to government agencies or industry. Only once does a text suggest contacting an environmental group. All the texts present environmental issues such as nuclear power and use of chemicals mainly from a technical point of view and generally omit social and environmental concerns.

The publications presented in the "Environmental Perspective" present enough scientific information to make it possible to evaluate the 53 environmental "waste" statements as inadequate and partial. Overall, it is clear that textbooks do not present fairly the views of environmentalists, but in most instances provide information that is supportive of the views of governments and industry.

Summary Assessment

The "summary assessment" for each textbook consists of an overview of the environmental content and an evaluation. The results of the summary assessments, presented in Table

5, are consistent with the above evaluation of the "qualitative statements." The environmental information that discusses "extinction" and "global warming" are evaluated as consistent with the "Environmental Perspective". The opposite occurs for evaluating text content on "waste": two-thirds of the environmental information is inconsistent with the "Environmental Perspective". As shown in Appendix C, summary assessments often contain examples of the environmental issues that are inconsistent with the "Environmental Perspective." The "quantitative environmental statements" present a good overview of what environmental content exists in the text, while "summary assessment" states what environmental content is lacking in the text. For example textbook #1, which deals with the study of physical geography, is an excellent subject area for environmental issues but none are included.

In summary, geography and science textbooks do not contain an abundance of environmental information. Also, as shown in Appendix A they generally fail to present such information from an "Environmental Perspective".

Conclusion

This chapter has described the results of the analysis of Ministry documents and textbooks and the results of the

rating validation. A comparison of the individuals' reports and the author's analysis shows that a problem of internal reliability exists only in discrepancies in the number of qualitative environmental statements. Several conclusions can be made from the results: the Ministry documents lack for the most part clear and concise policy statements and place very little emphasis on environmental issues. Textbooks are also not always clear in their stated purpose but, more importantly, lack environmental content. Furthermore, much of the content that appears is not presented from an "Environmental Perspective."

CHAPTER 5

Conclusions and Recommendations

This chapter provides an overview of the study. It states the major findings and recommendations which arise from the latter. Finally, some ideas for further research are suggested.

Overview

The purpose of the study was to evaluate Ministry documents and textbooks for their environmental content. The Ministry documents reviewed were the science and geography curriculum documents from grade 7-12/OAC's and the OSIS document. From the 66 available geography and science textbooks in Circular 14, a total of 24 texts were evaluated. The analysis of these documents was based on the "Environmental Perspective," designed specifically for this study. For this study this approach is integral to both the reliability and validity of the research.

Quantitative and qualitative collecting methods were employed. "Quantitative environmental statements" were recorded numerically for both the Ministry Documents and textbooks. "Qualitative environmental statements" were recorded as direct quotations and thereby yield specific examples of environmental content. These statements were subsequently evaluated using the "Environmental Perspective."

The study also interprets "policy" statements for each document; and defines the "purpose" of each text. These results are of secondary importance, but are useful, nonetheless in determining whether or not the Ministry has a policy emphasizing the environment.

A "summary assessment" is presented for the evaluation of each Ministry document and textbook. The "summary" provides an overview of the materials analyzed, thereby demonstrating the strengths and weaknesses of the documents and texts from an environmental viewpoint. The full analysis is presented in Appendix B and C.

Therefore this study has selected environmental components of documents and texts, established the framework for the analysis and validated the framework, and made the assessment.

Major Findings

The most obvious and striking finding revealed by the research is the lack of environmental content in Ministry documents and Ministry approved textbooks. Also, throughout many of the Ministry materials analyzed, the environmental content is not presented from an "Environmental Perspective," which is of much more serious concern. It is evident from the research that the Ministry's twelfth goal of education, "to develop respect for the environment and a commitment to the wise use of resources" (OSIS, 1989), is not implemented by means of texts for use in Ontario schools. The lack of environmental content discussed in the study will be described in the following three sections: Policy and Purpose, Ministry Documents, and Textbooks.

Policy and Purpose

Ministry policy statements are not clearly defined in all of the documents. As stated in Chapter three, the purpose of the policy is to improve organization and effectiveness, reflect personal values, and to remove confusion from within an organization. It is difficult to determine the purpose of many of the Ministry documents because they lack a clearly defined "policy" statement; this inhibits drastically the promotion of issues such as

environmental education. The same is true for the majority of textbooks analyzed; no clearly defined "purpose" statements are present.

Ministry Documents

Environmental data exist for all 22 Ministry documents; although the documents stress environmental issues, they do not do so from the "Environmental Perspective" as defined in this study. Fifty-one of the 144 environmental statements classified under "qualitative" were evaluated as incorrect, inadequate, and partial, thus suggesting that approximately one-third of the statements analyzed do not coincide with the "Environmental Perspective." The documents are perhaps more misleading, more in the manner of what they do not include, rather than what they do include. For example, divergent opinions, such as those which oppose nuclear power, which proposed the "zero release" of toxic wastes, and which proposed the cessation of pesticides use, are not presented in the documents. Such opinions are integral to the development of critical thinking skills of the youth of Ontario's schools today.

Even in mentioned environmental data, the substance is inconsistent with the "Environmental Perspective". Such inconsistencies in approach may have arisen because Ministry officials have failed to refer to or consult with

environmental groups before writing the documents. Typically the Ministry documents refer to government agencies and crown corporations as sources of further information on the environment. Thus the representation of the environmental groups is therefore limited. The views of Ontario Hydro, for example, a crown corporation totally committed to nuclear power, are seemingly prominent in the documents, for none of the documents presents views opposing nuclear power.

The science documents apparently are biased in their notion that all problems, including environmental ones, can be solved through scientific means. The concept of the "bigger is better" is a recurring theme. None of the documents, for example, examines the benefits of total organic farming, total recycling, total reforestation, or Schumacher's concept of "Small is Beautiful." Such views stand in opposition to the goals of economic growth and profit margins which are the cornerstones of government and large financial corporation philosophy.

In summary, the Ministry documents do not provide varying opinions on controversial ideas, thus denying the students in Ontario schools the right to an honest, fair, and balanced education, as outlined in the Ministry's goals of education.

Textbooks

The criticisms levelled at Ministry documents apply equally to textbooks from Circular 14. This is not surprising for texts are written to meet specific curriculum guidelines. In order for a textbook to be included in Circular 14, it must follow the Ministry of Education views to the letter. In addition textbooks are influenced by big business. None of the 51 publications referred in the "Environmental Perspective," was listed in Circular 14, even though many would perhaps have made excellent textbooks. These publications do not in any manner reflect policies or philosophies as espoused by government or by big business.

Recommendations

The major conclusion of this study is that both the Ministry documents and textbooks do not contain enough information concerning environmental issues. Moreover, the information presented is not expressed from an "Environmental Perspective," as outlined in this study. Both of these problems must be addressed and rectified. It is therefore recommended that this study be presented to the following so that changes can be made:

Ministry of Education

The Ministry must be informed that their documents and texts lack environmental content and what little content does exist is not expressed from an "Environmental Perspective." The Ministry should introduce a policy which emphasises the teaching of subjects from an "Environmental Perspective." Also, the OSIS documents, especially the science and geography curriculum, should be amended to include more and new environmental ideas. To accomplish this goal, the Ministry should involve environmentalists and environmental groups. Changing the Ministry's perspective and emphasis on the environment would then make it possible for publishers to submit environmental books to the Learning Materials Unit so that the book can be considered for Circular 14.

Select Committee on Education

The Select Committee on Education is a standing committee of the Provincial Legislature and consists of 11 members selected from all three parties. This committee deals with major educational changes such as the present de-streaming of grade 9 classes. The Ministry of Education, because of government bureaucracy, moves very slowly in the implementation of new programs. The environment can't wait that long. It is therefore pertinent that this committee be informed about the

environmental concerns expressed in this study. The Select Commmittee on Education could then make recommendations to the government that environmental issues should have a greater profile in all government Ministries.

Teachers

Teachers must be made aware of how environmental content is or is not presented in Ministry documents and texts. It is important for teachers to know that environmental issues can be presented from an "Environmental Perspective" rather than just from the Ministry's institutional perspective. At present teachers depend too much on free information which is presented by industry, government agencies, crown corporations and large lobby groups such as the Canadian Nuclear Association. These organizations do not really qualify as being concerned environmentalists.

Media

It should become public knowledge that schools do not emphasize an "Environmental Perspective" because of Ministry constraints. Public knowledge of this state of anti-environment affairs in the classroom should help bring pressure to bear on the government to bring about changes. These changes will alter the perspective of the teachers

and the students, to the ultimate benefit of the environment.

Faculties of Education

Faculties of Education must be informed of the manner in which the Ministry presents environmental issues in geography and science documents and texts from grades 7-12/OAC. New teachers should be instructed on how to approach an issue from an "Environmental Perspective." Teachers in general should be infused with an environmental philosophy which they may then impart to the students in the daily course of their interchange with these students.

School Boards

The findings and recommendations of this study should be communicated to school boards, so that they can apply pressure to the Ministry to increase the environmental content and philosophy of Ministry documents and texts. School boards therefore have a tremendous opportunity and responsibility to make a positive difference.

By making everyone aware that environmental education taught in the schools of Ontario has many shortcomings, it is possible that changes will occur in Ministry documents and texts.

Further Research

This study evaluates Ministry documents and texts for their environmental content. As stated in chapter two, very little research exists in the area of environmental education, particularly in regard to evaluation of Ministry Documents and texts for environmental contents as undertaken in this thesis.

This study does not show the amount of time teachers devote to environmental education in the classroom. Possibly, there are many teachers who are environmentally conscious and teach from an "Environmental Perspective". A further study may determine the number of teachers who teach from the "Environmental Perspective" approach as presented in this study. The Angus Reid Group poll (1989) divided Canadians into several groups spanning the environmental spectrum, ranging from the "The Activists" to "The Hostile." Only two groups, "Activists" at 18% and "Enthusiasts" at 9%, were committed totally to environmental issues. If only 27% of the population are genuinely concerned about the environment, the percentage of teachers concerned is not likely any different.

This study analyses only Ministry Documents and textbooks from Circular 14, in the subject area of geography and science. Further research could analyze curriculum for environmental content in other subjects like

history, math, and health education or determine what other environmental teaching material is used by teachers. Another interesting study could analyze curriculum at the Faculties of Education across Ontario for environmental content or could determine what type of environmental knowledge student teachers are receiving.

In conclusion, if Rachel Carson's famous fable "A Fable for Tomorrow"(1962) is not to come true, much more must be done in the teaching of our students regarding environmental issues. Society seems concerned with environmental issues. That concern is not yet demonstrated in Ministry of Education documents and textbooks.

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APPENDIX A

ENVIRONMENTAL PERSPECTIVE

FROM

1970 to 1989

Environmental Perspective for 1970

Extinction

Publication

DeBell, G. (Ed.). (1970). The environmental handbook. New York: Ballantine Books.

Event

First Earth Day, April 22.

Knowledge

"Sewage sludge discharged into New York harbour had destroyed all bottom life in the area used" (p. 262).

Global Warming

Publication

Esposito, J.C. (1970). Vanishing air. New York: Grossman.

Event

The American government established the Environmental Protection Agency (EPA).

Knowledge

"The conservationists claim that part of the increase in energy utilization has been induced by the power industry itself through sales programs and that prudent energy use would eliminate waste and reduce further energy requirements" (p. 258).

Waste

Publication

Chant, D.A. (Ed.). (1970). Pollution probe. Toronto: New Press.

Event

The Resource Recovery Act was passed in the U.S.A. which provided $463 000 000 over 3 years to reduce garbage.

Knowledge

"In Japan human illness and deaths had been traced to consumption of fish taken from the Minamata Bay, an estuary receiving mercury in waste from a chemical plant" (p. 261).
"Pressure mounted on detergent manufacturers to eliminate phosphates in the detergent formulation" (p. 261).

Environmental Perspective for 1971

Extinction

Publication

Commoner, B. (1971). The closing circle: Nature, man and technology. New York: Bantam Books.

Event

The World Bank began to include in its assessment of potential projects the environmental impact.

Knowledge

Lake Baikal in Siberia, the world's largest fresh water lake by volume, was being seriously polluted by chemical and pulp and paper mills.

Global Warming

Publication

Event

Scientists from 14 countries who met in Stockholm, Sweden, rejected the doomsday prophecies and global climatic conditions.

Knowledge

Scandinavian countries determined that much of their air pollution was coming from western Europe making them realize that pollution had no boundaries.

Waste

Publication

Taylor, F.J., Kettle, P.G., & Putnam, R.G. (1971). Pollution: The effluence of affluence. Toronto: Methuen.

Event

Greenpeace Foundation formed.

Knowledge

Oil pollution in the English Channel was creating serious pollution along the British coastline.
The Rhine River was so badly polluted again that all the fish from Bingen, West Germany to the Netherlands border were dying.

Environmental Perspective for 1972

Extinction

Publication

Meadows, D.H., Meadows, D.L., Randen J., & Behren, W.W. (1972). The limits to growth. New York: New American Library.

Event

"The first United Nations Conference on the Human Environment was held in Stockholm. Some 1 200 delegates representing 113 countries...to correct ecological abuses and enhance the quality of life on earth" (p. 279).

Knowledge

"The French government...along with Communist China continued to defy world appeals for ending nuclear testing in the environment" (p. 278).

Global Warming

Publication

Event

From the Stockholm Conference "establish an 'earth watch program'...a world wide surveillance network including at least 110 monitoring stations...to keep track of changes in the world atmosphere that might lead to climate and weather modification" (p. 276).

Knowledge

"As a means of coping with automobile traffic, no less than 35 European cities were reported planning underground railways" (p. 278).

Waste

Publication

Tucker, A. (1972). The toxic metals. London: Earth Island Limited.

Event

"In June the EPA banned--as of December 31--the general use of DDT..." (p. 278).

"On April 15, President Nixon and Prime Minister Trudeau signed in Ottawa the U.S.-Canadian Great Lakes Water Quality Agreement" (p. 277).

Knowledge

"One day's garbage from New York City, piled at a Staten Island landfill, made a striking display of environmental problem of waste disposal. The pile weighed 30 000 tons, yet represented only soiled wastes" (p. 275). "Waste recovery plant at Lowell Mass., will be the nations first full-scale plant to recover reuseable metals...At the initial operating level of 65 000 tons per year, the plant will leave toxic incinerator residue..." (p. 276).

Environmental Perspective for 1973

Extinction

Publication

Barbour, I.G. (Ed.). (1973). Western man and environmental ethics. Don Mills, ON: Addison-Wesley.

Event

The Convention on International Trade in endangered species of Wild Fauna and Flora designed to preserve wildlife set new guidelines for " It would prohibit commercial trade in 178 species of mammals, 113 birds, 44 reptiles..." (p. 232).

Knowledge

The Antarctic fin whale is "the most seriously depleted of the currently harvested whales" (p. 232).

Global Warming

Publication

Event

Construction of the permanent headquarters began for the United Nations Environmental Program in Kenya.

Knowledge

"As a result of energy shortages in the developed countries like the United States, pressure developed for easing environmental standards to permit the use of coal or high-sulfur oil" (p. 231).

Waste

Publication

Null, G. (1973). Body pollution. New York: Anco.

Event

The UN agency, Maritime Consultative Organization, held a meeting in London and the 71 countries who participated set new guidelines and rules for tankers.

Knowledge

A study on waste paper by the US, Midwest Research Institute stated that "the 1973 recycling rate of 20% could be raised to 26% by 1985" (p. 233).

Environmental Perspective for 1974

Extinction

Publication

Mesarovic, M., & Pestel, E. (1974). Mankind at the turning point. New York: E.P. Dutton.

Event

"The three conferences of global environmental import were the Law of the Sea Conference in Caracas, Venezuela, the World Population Conference in Bucharest, Romania, and the World Food Conference in Rome, Italy.

Knowledge

Global Warming

Publication

Ehrlich, P.R., & Ehrilch, A.H. (1974). The end of affluence: A blueprint for your future. New York: Ballantine.

Event

"The danger from propellent sprays constituted perhaps the main theme of a five-day conference in Paris..." (p. 236). "The Latest Progress in Evaluating Effects on Environmental Pollution on Health...the conference was attended by 700 specialists from 50 countries" (p. 236).

Knowledge

"Worldwide use of chemical sprays is estimated at a half a million tons annually, at least half of which is used in the United States" (p. 236).

Waste

Publication

Schumacher, E.F. (1974). Small is beautiful: A study of economics as if people mattered. London: Abacus.

Event

"Seven nations signed a pact in Finland in March to prevent further pollution of the Baltic Sea" (p. 236).

Knowledge

"New Orleans and nearby communities were using drinking water from the Mississippi River that showed a high percentage of potentially cancer producing contamination by industrial chemicals" (p. 237).

Environmental Perspective for 1975

Extinction

Publication

Regenstein, L. (1975). The politics of extinction. New York: Collier MacMillan.

Event

"Signed by 57 of 80 nations, the Endangered Species Treaty restricts, but does not ban, trade in products derived from endangered species" (p. 237).

Knowledge

"Japan agreed to stop exterminating the sperm whale and adhere to the International Whaling Commission quotas. The Japanese are substituting sharks" (p. 237).

Global Warming

Publication

Event

"The Global Environmental Monitoring System, a mosaic of existing and planned data collection system...started monitoring African forest mapping" (p. 236).

Knowledge

"Spurred on by the fourfold increase in the price of fossil fuels, many nations plunged headlong into the race for nuclear power plants. World nuclear capacity rose from 16 300 megawatts in 1970 to 82 000 megawatts in 1975" (p. 237).

Waste

Publication

Fueller, J.G. (1975). We almost lost Detroit. New York: Ballantine.

Event

A "study by a Harvard/Brandeis group headed by Wassily Leontief, which concluded that although mankind will generate four times as many pollutants in the year 2000 as in 1970, pollution need not reach the environment" (p. 238).

Knowledge

"Two top pesticide targets of environmentalists, aldrin and dieldrin, had their regulations cancelled by EPA" (p. 239).

Environmental Perspective for 1976

Extinction

Publication

Dolman, A.J. (Ed.). (1976). Reshaping the international order: A report to the Club of Rome. Scarborough, ON: New American Library of Canada.

Event

"A pact to cleanup and protect the Mediterranean Sea was adopted in Barcelona by 18 Mediterranean nations" (p. 204).

Knowledge

"Environmentalists active in wilderness preservation successfully thwarted construction of dams along the New River in Carolina and the Shake River in Idaho" (p. 204).

Global Warming

Publication

Commoner, B. (1976). The poverty of power: Energy and the economic crisis. New York: Bantam Books.

Event

"By 1976 nearly all UN agencies were invested with some environmental mission, spearheaded, of course, by UNEP" (p. 203).

Knowledge

"1978: model cars must comply with stricter standards than manufacturers had anticipated" (p. 206).

Waste

Publication

Knelman, F.H. (1976). Nuclear energy: The unforgiving technology. Edmonton, Alberta: Hurtig.

Event

"Congress passed the Toxic Substances Control Act, which authorizes the EPA to require testing of new chemicals...the act also calls for a complete halt to production of PCB's within 2 years" (p. 206).

Knowledge

"Allied Chemical Co. was ordered by the Courts to pay $13.3 million--the largest award of its kind--in damages for polluting the James River with the highly toxic chemical kepone" (p. 204).

Environmental Perspective for 1977

Extinction

Publication

Science Council of Canada. (1971). Canada as a conserver society: Resource uncertainties and the need for new technologies. (Report No. 27). Ottawa, ON: Supply and Services Canada.

Event

"In May 1977 the government of Kenya banned all game hunting in that nation. The action was intended to preserve the world's dwindling wildlife" (p. 195).

Knowledge

"Work on the Tennessee Valley Authority's Tellico Dam Project was curtailed when it was learned the project would destroy the spawning ground of an endangered species of perch" (p. 197).

Global Warming

Publication

Lovins, A.B. (1977). Soft energy paths: Toward a durable peace. Cambridge, MA: Ballinger.

Event

"The federal Food and drug Administration ordered that all aerosol containers using fluorocarbon propellents carry a warning that they pose a demonstrable threat to the earth's ozone layer" (p. 195).

Knowledge

"Scientific studies continued to confirm that industrial and consumer practices are damaging the earth's delicate shield of the ozone" (p. 194).

Waste

Publication

Fueller, J.G. (1977). The poison that fell from the sky. New York: Random House.

Event

"The threat to public health prompted Congress to pass the Toxic Substance Control Act which, it is hoped, will provide the framework for control of industrial chemicals and other hazardous substances" (p. 196).

Knowledge

"The hazards of oil drilling were demonstrated when an oil rig in the North Sea exploded" (p. 194).
"DBCP, a pesticide caused sterility in 14 workers at the Occidental Chemical Company in California" (p. 196).

Environmental Perspective for 1978

Extinction

Publication

Caldicott, H. (1978). Nuclear madness: What you can do. Brookline, MA: Autumn Press.

Event

The IWC set a "moratorium on the taking of sperm whales in the southern hemisphere" (p. 198).

Knowledge

"The United States lifted most of its export restrictions on wild ginseng plants and the pelts of bobcat, lynx, and river otter" (p. 198).

Global Warming

Publication

Gribben, J. (Ed.). (1978). Climatic change. New York: Cambridge University Press.

Event

U.S. Forest Service recommended that "60 million acres be considered for wilderness set-asides" (p. 199).

Knowledge

"If the depletion rate is not checked through reforestation and sound timber harvesting methods, the world stands to lose about 90% of its plants and animal species. Moreover, carbon dioxide escaping from cut-over soils, added to the amount already in the atmosphere from the burning of fossil fuels, could warm the earth's climate" (p. 198).

Waste

Publication

Higgins, R. (1978). The seventh enemy: The human factor in the global crisis. Toronto: Hodder and Stoughton.

Event

"The President's Council on Environmental Quality labeled 1978 as "the beginning of a new phase for the control of water pollution" (p. 199).

Knowledge

"There are some 30 000 chemicals loose in the environment today, according to the UNEP report, and several hundred others going into commercial production every year" (p. 198).

"Dozens of malarial mosquito species have built up an immunity to the insecticides DDT and dieldrin, and the disease is coming back" (p. 198).

Environmental Perspective for 1979

Extinction

Publication

Brown, M. (1979). Laying waste: The poisoning of America by toxic chemicals. New York: Washington Square Press.

Event

"Twenty-two nations, most of them African and European, signed the Convention on the Conservation of Migratory Species of Wild Animals" (p. 210).

Knowledge

"The International Whaling Commission banned all whaling in the Indian Ocean and issued a temporary ban on the killing by factory ships of all whale species except the abundant mink" (p. 220).

Global Warming

Publication

Gribbon, J. (1979). What's wrong with our weather. New York: Scribner's.

Event

Knowledge

"The depletion of the world's forests continued at a rapid rate, and some projections released during the year predicted that loss of woodlands could total 400 million hectares by the year 2000" (p. 220).

Waste

Publication

Nader, R., & Abbotts, J. (1979). The menace of atomic energy. New York: W.W. Norton.

Event

"Forecasts released by the U.S. government , the United Nations environmental Program, Worldwatch Institute, and others painted a scene of continued environmental decay and, ultimately, an overall decline in the quality of human life" (p. 209).

Knowledge

"On June 3, a Mexican oil well named Ixtoc 1 began spewing oil in the Gulf of Campeche" (p. 210).

"On March 28, the Three Mile Island nuclear power plant...broke down..." (p. 211).

"Acid rain also appeared in Canada during 1978-79, and an international advisory group was organized to identify the extent of the problem" (p. 211).

Environmental Perspective for 1980

Extinction

Publication

Rifkin, J. & Howard, T. (1980). Entropy: A new world view. New York: The Viking Press.

Event

"The World Conservation Strategy, issued by IUCN, UNEP, and WWF, is a framework for coordinated global, regional, and national action by governments...for well-managed economic development and conservation" (p. 222).

Knowledge

From the Global 2000 report "Because of pollution, development, and deforestation, the report projects a reduction in genetic diversity. The result could be the extinction of one fifth of all the world's plant and animal species" (p. 222).

Global Warming

Publication

Bernard, H.W., Jr., (1980). The greenhouse effect. Cambridge, MA: Ballinger.

Event

"The Global 2000 report was the outcome of President Jimmy Carter's May 23, 1977, Environmental Message to Congress" (p. 221).

Knowledge

From Global 2000 "If present trends continue, the report projects massive depletion of forests..." (p. 221).

Waste

Publication

Weller, P. (1980). Acid rain: The silent crisis. Kitchener, ON: Between the Lines.

Event

The Global 2000 three-volume study stated "If present trends continue, the world in 2000 will be more crowded, more polluted, less stable economically and more vulnerable to disruption..." (p. 221).

Knowledge

"Each year, American industry generates more than 96 000 000 000 lbs of hazardous waste" (p. 48).
"Toxic chemicals seeping from the Love Canal in New York forced area residents to evacuate" (p. 47).

Environmental Perspective for 1981

Extinction

Publication

Peccei, A. (1981). One hundred pages for the future. New York: New American Library.

Event

"In July, international wildlife specialists met in Zimbabwe, to finalize plans to conserve elephants and white species of rhinoceros" (p. 204).

Knowledge

"As many as 50 000 lakes in eastern North America are believed to be affected by acid rain, which kills fish life by raising the acidity of the water" (p. 203).

Global Warming

Publication

Sternglass, E. (1981). Secret fallout: Low-level radiation from Hirohsima to Three Mile Island. New York: McGraw-Hill.

Event

In the United States "The Clean Air Act was due for Congressional renewal" (p. 205).

Knowledge

President Reagan appointed "Anne Gorsuch, a former Colorado legislator who had opposed air-quality and toxic wastes regulations, to head the U.S. Environmental Protection Agency" (p. 204).

Waste

Publication

Event

Canada's Minister of the Environment John Roberts spoke before the American Association for the Advancement of Science stating "Even if we were able to eliminate our own emissions (acid rain), we would still be receiving more than six million tons of these chemicals from sources in the United States" (p. 202).

Knowledge

"In California, following an outbreak of the Mediterranean fruit fly ("Med fly") which threatened the California fruit harvest, the spraying of Malathion caused public concern about the insecticides possible effects on humans" (p. 205).
"In the north east (U.S.A.), a record infestation of gypsy moth defoliated trees on more than 11 million acres of woodlands" (p. 205).

Environmental Perspective for 1982

Extinction

Publication

Schell, J. (1982). The fate of the earth. New York: Avon Books.

Event

"The International Union for the Conservation of Natural Resources and the World Wildlife Fund began planning a campaign conserve tropical forests and the primates living in them" (p. 213).

Knowledge

"The International Whaling Commission voted a world wide ban on commercial whaling starting in 1985" (p. 213).

Global Warming

Publication

Event

The Third World Conference on National Parks met in Bali, Indonesia and " Participants...considered the management and future of the more than 1 000 000 000 acres of wildlife and water areas held in protected status by 120 countries" (p. 214).

Knowledge

Mostafa Tolba the director of UNEP noted that "the previous 10 years have seen environmental degradation gather pace on every front" (p. 213).

Waste

Publication

Jackson, J. & Weller, P. (1982). Chemical nightmare: The unnecessary legacy of toxic wastes. Toronto: Between the Lines.

Event

"The year 1982 marked the 10th anniversary of the banning of the pesticide DDT in the United States" (p. 215).

Knowledge

Since the DDT ban has been into effect "Eagles are appearing in places from which they have been absent for many years. Peregrines are also returning to many areas. Perhaps the most impressive come back is by the brown pelican..." (p. 215).

Environmental Perspective for 1983

Extinction

Publication

Regehr, E., & Rosenblum, S. (Eds.). (1983). Canada and the nuclear arms race. Toronto: James Lorimer.

Event

"A five day seminar on environmental planning for sustainable development was held in spring 1983 at the Tufts University...France" (p. 214).

Knowledge

"The United States Fish and Wildlife Service revealed that up to 300 bald eagles, protected under the law, had been killed over the previous three years to supply feathers...for Native artifacts" (p. 217).

Global Warming

Publication

McKay, P. (1983). Electric empire: The inside story of Ontario Hydro. Toronto: Between the Lines.

Event

The World National Parks Congress developed "Ten objects...as part of the plan, which calls for the establishment by 1992 of a world wide network of national parks" (p. 214).

Knowledge

"In mid-October, EPA issued an alarming new report, indicating that the "greenhouse effect" a warming trend caused by build-up of carbon dioxide in the atmosphere - will begin to be felt as early as the 1990's" (p. 217).

Waste

Publication

Tataryn, L. (1983). Formaldehyde on trial: The politics of health in a chemical society. Toronto: James Lorimer.

Event

"In August the United States and Canada signed an agreement to conduct a joint project to monitor the flow of pollutants that caused acid rain" (p. 217).

Knowledge

"On September 1, EPA added 133 hazardous waste sites to its 'national priority list,' bringing the total to 546" (p. 213).

Environmental Perspective for 1984

Extinction

Publication

Ehrlich, P.R. & Sagan, C. (1984). The cold and the dark: The world after nuclear war. New York: W.W. Norton.

Event

The World Wildlife Fund "launched an ambitious campaign to save rare and endangered plants around the world" (p. 214).

Knowledge

"More than 25 000 species of plants are threatened with extinction, and conservationists warn, the list is growing rapidly -especially in tropical rainforests" (p. 214).
In the U.S.A. "A decline in the number of black ducks, among the nation's best known water fowl, continued to puzzle biologists...down 60% in three decades" (p. 216).

Global Warming

Publication

Event

The International Union for the Conservation of Nature and Natural Resources held a conference in Madrid, Spain, "centered around the theme 'Partnership in Conservation: Toward a world Conservation Plan'" (p. 214).

Knowledge

"Fog in some parts of California, is acidic enough to burn the eyes and throat. Virginia's rain in 1983 was twice as acidic as during the years before" (p. 216).

Waste

Publication

Kumar, S. (Ed.). (1984). The Schumacher lectures: Volume 2. London: Abacus.

Event

"At a meeting in Ottawa, Canada, in March, ministers from nine European countries and Canada signed a pact agreeing to reduce sulfur emissions into the air by 30% in the next ten years" (p. 215).
December, catastrophic poison gas leak from the Union Carbide plant in Bhopal India, which took more than 2000 lives.

Knowledge

In the U.S.A. "the amount of hazardous waste produced in the country annually is estimated at 71 billion gallons, or 240 million tons, six times the former assessment" (p. 216).

Environmental Perspective for 1985

Extinction

Publication

Howard, R.W. (1985). The vanishing land. New York: Ballantine.

Event

The International Union for the Conservation of Nature and Natural Resources "formed a special task force to develop an integrated action plan for the ecological rehabilitation of African countries affected by drought an desertification" (p. 217).

Knowledge

"The Nile crocodile which had been fully protected...a limited trade in crocodile skins be allowed...a quota of just over 11 600 skins over a year" (p. 218).

"Chinese conservation authorities reintroduced the Pere David deer...in their native country...from European preserves" (p. 218).

Global Warming

Publication

Event

International Year of the Forest

Knowledge

"The Environmental Defense Fund...found a 'linear' relationship between pollution from copper smelting plants in the Southwest (U.S.A.) and acid rain in the Rocky Mountains, 600 miles downwind" (p. 219).

Waste

Publication

Barlett, D., & Steele, J.B. (1985). Forevermore: Nuclear waste in America. New York: W.W. Norton.

Event

In the U.S.A. "Private industry obtained a measure of relief from toxic discharge standards when the U.S. Supreme Court ruled that EPA..." (p. 219).

Knowledge

The Union Carbide chemical plant in Institute, WV, "had several leaks of methyl isocyanate, the same chemical accidentally released in 1984 Bhopal tragedy...28 times in the last five years.... In August, another leak of hazardous chemicals sent toxic gas pouring into the air...more than 130 residents had to be treated" (p. 219).

Environmental Perspective for 1986

Extinction

Publication

Malcolmson, R.W. (1986). Nuclear fallacies: How we have been misguided since Hiroshima. Montreal: McGill-Queen's University.

Event

"The rupture and meltdown of a reactor at the Chernobyl nuclear power station in the Soviet Ukraine..." (p. 222).

Knowledge

"The EPA's first systematic acid-rain study of Eastern U.S. Lakes,... found more than 9000 lakes sensitive to acid rain; more than 2 400 of them already were acidic" (p. 224).

Global Warming

Publication

Gribben, J. (Ed.). (1986). The breathing planet. New York: Basil Blackwell.

Event

The Alliance for Responsible CFC Policy, made up of CFC - manufacturers and users, volunteered "a reasonable global limit" for CFC's.

Knowledge

"As reported in the British journal Nature "results show little trend in the 19th century, marked warming to 1940, relative steady conditions to mid-1970's and a subsequent rapid warming" (p. 223).

Waste

Publication

Keating, M. (1986). To the last drop: Canada and the world's water crisis. Toronto: Macmillan.

Event

A symposium on dioxins and related chemicals was held at Fukuoka, Japan.

Knowledge

"According to the EPA, dioxin, is "one of the most perplexing and potentially dangerous chemicals ever to pollute the environment. Dioxins can be generated by the incineration of many products and are trace contaminants in certain antiseptics, wood preservatives, bactericides, and herbicides - including the Agent Orange defoliant" (p. 223).

Environmental Perspective for 1987

Extinction

Publication

World Commission on Environment and Development. (1987). Our common future. Oxford: Oxford University.

Event

TRAFFIC, a global network of trade monitors affiliated with the World Wildlife Fund, Reported that Austria, France and Japan are the most serious violators of trading in endangered species.

Knowledge

Trade in wildlife is a $5 billion industry in endangered species.

Global Warming

Publication

Event

Twenty-four nations formally ratified, in Montreal, to freeze production of key CFC's.

Knowledge

"From 1978 to 1985...global atmospheric ozone fell about 4%" (p. 222).

Waste

Publication

Brown, M.H. (1987). The toxic cloud: The poisoning of America's air. New York: Harper and Row.

Event

A garbage scow called Mobro left Long island on March 22with solid waste,and travelled the Atlantic coast for six months. The scow "helped bring home to Americans the enormity of their waste-disposal problems" (p. 223).

Knowledge

A study linked exposure of high current power lines to increased risks of cancer and neurological changes. Of 11 600 homes surveyed for radon gas, 21% were over the EPA recommended levels.

Environmental Perspective for 1988

Extinction

Publication

Gradwohl, J. & Greenberg, R. (1988). Saving the tropical forests. London: Earthscan Publication.

Event

"On Oct. 7, President Reagan signed a reauthorization of the Endangered Species Act" (p. 221).

Knowledge

"The African Wildlife Foundation reported census data showing only 750,000 African elephants still remaining by year-end 1987 -not quite 58% of the number recorded nine years earlier" (p. 221).

Global Warming

Publication

Gribbin, J. (1988). The hole in the sky. Toronto: Bantam Books.

Event

"On October 31, a total of 25 nations, drafted an NOx - limiting treaty in Sophia, Bulgaria" (p. 220).

Knowledge

"For the U.S. farmers the summer of 1988 was the driest in more than 50 years" (p. 220).

Waste

Publication

Brown, L.R. (1988). State of the world 1988. New York: W.W. Norton.

Event

"In mid-September, the U.S. Energy Department officials announced that they were delaying indefinitely the permanent storage of high-level nuclear wastes in a $700 million underground vault near Carlsbad, NM" (p. 221).

Knowledge

"Bathers along Eastern U.S. beaches encountered hypodemic syringes, prescription bottles, used bandages, sutures -even vials of blood, some of which later tested positive for hepatitis and AIDS" (p. 220).

Environmental Perspective for 1989

Extinction

Publication

Brown, L.R. (1989). State of the world 1989. New York: W.W. Norton.

Event

"In a typical debt-for-nature swap earlier this year, the World Wildlife Fund...bought $1 million worth of Ecuadoran debt held by Bankers Trust at the discounted price of $354 500" (p. 53).

Knowledge

"Madagascar, more than 90% of the original vegetation has disappeared" (p. 28).

"At least 12% of bird species in the Amazon Basin, as well as 15% of the plants in Central and South America...one dead" (p. 28).

Global Warming

Publication

Roan, S. (1989). Ozone Crisis: The 15 year evolution of a sudden global emergency. Toronto: John Wiley and Sons.

Event

James Hansen, head of NASA's Goddard Institute for space studies "became perhaps the most prominent scientist willing to say straight out that the earth-warming effect of excess carbon monoxide...had crossed the line from theory into fact" (p. 34).

Knowledge

"Today CO stands at 350p.p.m., and by 2050 it could reach 500-700 p.p.m., higher than it has been in millions of years" (p. 36).

"The annual market for CFC's is some $2.2 billion" (p. 41).

Waste

Publication

Day, D. (1989). The ecowars: True tales of environmental madness. Toronto: Key Porter Books.

Event

"For more than two years, the Pelicano sailed around the world seeking a port that would accept its 14 000 tons of toxic incinerator ash" (p. 42).

Knowledge

"Each year Americans throw away 16 billion disposable diapers, 1.6 billion pens, 2 billion razors and blades and 220 million tires" (p. 43).

"In West Germany 35 000 to 50 000 landfill sites have been declared potentially dangerous because they may threaten vital ground water supplies" (p. 43).

APPENDIX B

ANALYSES OF MINISTRY DOCUMENTS

This appendix contains the analysis of each Ministry Document. Each analysis is numbered, with numbers corresponding to the following documents that are analyzed:

1. Ontario Schools: Intermediate and senior divisions (grade 7-12 OAC's).

2. Science: Intermediate and senior divisions. Program outline and policy. Part 1.

3. Science: Grade 7 and 8. Part 2

4. Science: Grade 9 and 10, general level. Part 3.

5. Science: Grade 9 and 10, advanced level. Part 4.

6. Science: Grade 9 and 10, basic level. Part 5.

7. Science: Grade 11 and 12, basic level. Part 6.

8. Science: Environmental science, grades 10 to 12, general level. Part 7.

9. Science: Environmental science, grades 10 to 12, advanced level. Part 8.

10. Science: Applied biology and applied chemistry, grade 11, general level. Part 9.

11. Science: Applied physics and technological science, grade 12, general level. Part 10.

12. Science: Geology, grade 12, general and advance levels. Part 11.

13. Science: Biology, grade 11, advanced level and the OAC. Part 12.

14. Science: Chemistry, grade 11, advanced level and the OAC. Part 13.

15. Science: Physics, grade 12, advanced level and the OAC. Part 14.

16. Science: Science in society, OAC. Part 15.

17. Geography: Intermediate and senior decisions. Policy and program expectations. Part A.

18. Geography: Planning at the local level. Part B.

19. Geography: The intermediate division program. Part C.

20. Geography: The senior division program, revised courses. Part D.

21. Geography: The senior division program, new courses. Part E.

22. Geography: The senior division program, Ontario academic courses. Part F.

MINISTRY DOCUMENT #1

Publications Details

Ontario Ministry of Education. (1989). Ontario schools: Intermediate and senior divisions (Grades 7-12/OAC's). Toronto: Queen's Printer.

Stated Policy

The document's policy is to provide the greatest possible opportunity for every student to develop as completely as possible his/her abilities and interests and to meet each student's special needs.

Environmental Statements: Quantitative

Term "environment" used: 2
Number of pages: 3 out of 47 or 6%
Environmental issues: 1

Environmental Statements: Qualitative

1. "Develop respect for the environment and a commitment to the wise use of resources " (p. 3). (Ministry of Education's twelfth goal of education).

Environmental perspective: (1) 1972

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

OSIS specifically states the Ministry policy on students development and other policies such as guidance, co-operative education and multiculturalism. Except for the Ministry's twelfth goal of education, there is no other mention of environmental education in the document.

MINISTRY DOCUMENT #2

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Program outline and policy. Part 1. Toronto: Queen's Printer.

Stated Policy

The overall policy for science courses major feature is "Each course shall address the content and process of science through core and optional units of study" (p. 25). Also, a great number of specific policies exist in all the science documents such as, student activities in the laboratory, time allocations for units of study, introduction of non-guide courses, using the International System of Units for measurement, evaluation of students and treating the science course at three difference levels.

Environmental Statements: Quantitative

Term "environment" used: 21
Number of pages: 19 out of 104 or 18%
Environmental issues: 20

Environmental Statements: Qualitative

1. Science curriculum aim number five states "respect for the environment and a commitment to the wise use of resources" (p. 11).
2. "To what extent, if any, are non-renewable resources being depleted? How should conservation, if needed, be accomplished?" (p. 52).

Environmental perspective: (1) 1972, (2) 1972
Evaluation of statements:

Correct	1	Incorrect	2
Adequate	1	Inadequate	2
Impartial	1	Partial	2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The first half of the document describes the aims, goals and program for the teaching of science in Ontario schools from grade 7-12/OAC's. Part two of the document introduces some special features of the science program such as safety, sex equity, multiculturalism, and values, but it does not emphasize the environment as a major concern. Environmental examples are used throughout but they are, in most cases, presented from a scientific view rather than from an environmental point of view. The example on nuclear power shows that "students must be involved in the study of societal implications of using the technology, including an analysis of possible risks" (p. 52).

MINISTRY DOCUMENT #3

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Grade 7 and 8. Part 2. Toronto: Queen's Printer.

Stated Policy

The two courses Science, Grade 7 and Science, Grade 8, are "intended to help students see something of the panorama of of science, enjoy the subject, and appreciate its application to their lives and to society in general" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 13
Number of pages: 22 out of 49 or 45%
Environmental issues: 47

Environmental Statements: Qualitative

1. "Some methods of acquiring the substances demanded by society may have detrimental effect on the environment (e.g., clear cutting and strip mining)" (p. 17).
2. "Because water is a plentiful solvent, it is used in large quantities to dispose of used solutes, especially in industry. This practice although convenient and effective, often pollutes the sources of our drinking water" (p. 31).

Environmental perspective: (1) 1971, (2) 1986

Evaluation of statements:				
	Correct	1,2	Incorrect	
	Adequate		Inadequate	1,2
	Impartial		Partial	1,2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 7 and 8 science. Both courses have one strong environmental core unit out of a possible four units. The remainder of the core units and all of the optional units deal with environmental concerns lightly. Most of the environmental issues in the document are presented from a neutral view-point. For example "There is a need to encourage and support the development and use of machines that are energy efficient and that are powered by energy from renewable resources" (p. 35).

MINISTRY DOCUMENT #4

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Grades 9 and 10, general levels. Part 3. Toronto: Queen's Printer.

Stated Policy

The science program of Grades 9 and 10 are "intended to help students see something of the panorama of science, enjoy the subject, and appreciate its application to their lives and society in general" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 31
Number of pages: 26 out of 57 or 46%
Environmental issues: 62

Environmental Statements: Qualitative

1. "The long-term effect on ecosystems of the use of chemicals in new pesticides and herbicides is not yet fully known" (p. 31).
2. "Students will be encouraged to develop a willingness to base their own use of energy and natural resources on the principles of a conserver society" (p. 39).

Environmental perspective: (1) 1970, (2) 1977

Evaluation of statements:				
	Correct	2	Incorrect	1
	Adequate	2	Inadequate	1
	Impartial	2	Partial	1

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 9 and 10 general level science. The grade 9 science course is very weak in its study on environmental issues, but the grade 10 science course adequately deals with environmental issues in two out of its five core units. The following statement is an example of the documents' mediocrity regarding environmental concepts "It is postulated that the large amounts of carbon dioxide produced by the burning of fuel may change the world's climate in the future" (p. 15).

MINISTRY DOCUMENT #5

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Grade 9 and 10, advanced level. Part 4. Toronto: Queen's Printer.

Stated Policy

The science program of Grades 9 and 10 are "intended to help students see something of the panorama of science, enjoy the subject, and appreciate its application to their lives and society in general' (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 23
Number of pages: 23 out of 59 or 39%
Environmental issues: 55

Environmental Statements: Qualitative

1. "Pesticides and herbicides are used to increase crop yields. They also require energy in their production and can have harmful environmental effects unless carefully controlled" (p. 25).
2. "Nuclear fuels are used to produce electrical energy, which in turn is used to keep us warm in winter and cool in summer. This source of energy, however, presents possible hazards, which must be controlled " (p. 41).

Environmental perspective: (1) 1979, (2) 1976

Evaluation of statements:			
Correct	1	Incorrect	2
Adequate		Inadequate	1,2
Impartial		Partial	1,2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 9 and 10 advanced level science. Both the grade 9 and 10 courses are weak on environmental issues with the exception of an optional unit in the grade 10 curriculum entitled "waste management". More than half of the environmental issues in the document come from this unit. Significantly, this unit states that "waste can be burned in large furnaces to produce energy from heating buildings or generating electricity" (p. 51) and recommends to contact the Ontario Waste Management Corporation and the Ontario Ministry of the Environment for additional information. The document does not include any environmental groups from which the reader can obtain information on environmental concerns.

MINISTRY DOCUMENT #6

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Grade 9 and 10, basic level. Part 5. Toronto: Queen's Printer

Stated Policy

The science program of Grades 9 and 10 are "intended to help students see something of the panorama of science, enjoy the subject, and appreciate its application to their lives and society in general" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 4
Number of pages: 12 out of 53 or 23%
Environmental issues: 13

Environmental Statements: Qualitative

1. "Large quantities of salt are used to melt ice on the roads. The resulting solution may cause extensive damage to cars and roads" (p. 21).
2. "The recycling of materials conserves limited natural resources" (p. 33).

Environmental perspective:

Evaluation of statements:				
	Correct	1,2	Incorrect	
	Adequate	2	Inadequate	1
	Impartial	2	Partial	1

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document outlines the core and optional units for grades 9 and 10 basic level science. The lack of quantitative information demonstrates a very poor treatment of environmental concerns. The segment entitled "Sun, Skin, and Eyes," for example, is inadequate because it totally ignores how the depletion of the ozone layer can cause skin cancer. The document offers a number of ideas which contradict the wise use of the environment's resources. For example, in "Teaching Suggestions," it recommends that styrofoam cups, which are made from environmentally hazardous chlorofluorocarbons are good to use in certain experiments.

MINISTRY DOCUMENT #7

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Grade 11 and 12, basic level. Part 6. Toronto: Queen's Printer.

Stated Policy

"In the Senior Divisions at the basic level, students should be provided with further development of the mosaic approach used in the Intermediate Division" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 20
Number of pages: 15 out of 51 or 29%
Environmental issues: 33

Environmental Statements: Qualitative

1. "The obstacles to recycling and the problems connected with landfill sites, incineration, and the disposal of chemical wastes should be discussed" (p. 17).
2. "Chemicals such as myrex, dioxin, and heavy metals are transferred through food chains and may eventually be consumed by humans" (p. 41).

Environmental perspective: (1) 1982, (2) 1972

Evaluation of statements:				
	Correct	1	Incorrect	2
	Adequate	1	Inadequate	2
	Impartial	1	Partial	2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 11 and 12 basic level science. The environmental issues dealt with are limited for the two courses. The grade 11 course has very little environmental content, whereas two units out of the seven units in the grade 12 course contain two-thirds of the environmental issues. Many of the units such as "consumer chemistry," and "outdoor living" could have included a great deal of environmental content, but they do not.

MINISTRY DOCUMENT #8

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Environmental science, grades 10 to 12, general level. Part 7. Toronto: Queen's Printer.

Stated Policy

In the Senior Division students "are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 19
Number of pages: 38 out of 80 or 48%
Environmental issues: 135

Environmental Statements: Qualitative

1. "By using integrated pest management, one can decrease the use of chemical pesticides" (p. 27).
2. "Agricultural practices that increase efficiency may depend on energy-intensive products, such as chemical fertilizers and pesticides" (p. 33).
3. "The proper planning and maintenance of lawns and gardens help prevent the erosion of properties" (p. 51).

Environmental perspective: (1) 1971, (2) 1980, (3) 1978

Evaluation of statements:	Correct 1,2,3	Incorrect
	Adequate 1	Inadequate 2,3
	Impartial 1	Partial 2,3

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 10, 11 and 12 general level environmental science. Each grade level has one or two excellent units dealing with environmental content, but many of the units lack strong environmental points-of-view. The document leans toward the use of chemicals: " the use of chemical pesticides in energy intensive North America lowers the price of food by saving labour and reducing the loss of plants to pests" (p. 63).

MINISTRY DOCUMENT #9

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Environmental science, grade 10 and 12, advanced level. Part 8. Toronto: Queen's Printer.

Stated Policy

In the Senior Divisions students "are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 27
Number of pages: 32 out of 64 or 50%
Environmental issues: 103

Environmental Statements: Qualitative

1. "The construction and operation of nuclear power plants continues to be a controversial issue. The capital cost, disposal of wastes, and long-term effects of releasing low level amounts of radioisotopes into the environment are topics in debate" (p. 37).
2. "Many new crop varieties have little resistance to some pests. Consequently, pesticides often have to be used for these plants" (p. 46).

Environmental perspective: (1) 1976, (2) 1980

Evaluation of statements:			
Correct	1,2	Incorrect	
Adequate		Inadequate	1,2
Impartial		Partial	1,2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grades 10 and 12 advanced level environmental science. The grade 10 course has only one strong core unit "energy systems" which deals with environmental issues. The remainder of the course is largely related to biology topics. The grade 12 course has an excellent core unit dealing with energy, and it has two excellent optional units which deal with health hazards and pests. Although an excellent unit, the statement in "pests and pest control" that "Without pest control, starvation and poor health would become even greater world problems than they are at present" (p. 55), is irresponsible from an environmental perspective.

MINISTRY DOCUMENT #10

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Applied biology and applied chemistry,grade 11, general. Part 9. Toronto: Queen's Printer.

Stated Policy

In the Senior Division students "are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 21
Number of pages: 20 out of 64 or 31%
Environmental issues: 59

Environmental Statements: Qualitative

1. "The reduction of waste should be related to the wise use of energy" (p. 23).
2. "The safe handling of pesticides and herbicides may prevent the health problems that arise from long-term exposure to toxins" (p. 25).
3. "Chemical spills and the improper disposal of waste chemicals sometimes cause severe environmental and health hazards" (p. 45).

Environmental perspective: (1) 1980, (2) 1970, (3) 1982

Evaluation of statements:				
	Correct	1,2,3	Incorrect	
	Adequate	1	Inadequate	2,3
	Impartial	1	Partial	2,3

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grade 11 general level biology and chemistry. With exception of one core unit in biology and one optional unit in biology and chemistry, the two courses lack environmental content. It also seems that the units dealing with environmental issues are optional. The two courses examine common environmental issues such as DDT and acid rain; however, the document ignores the controversial issues such as nuclear power by presenting them from a neutral point-of-view: "Environmental issues always have many sides. By considering all sides of an issue, we can make rationale and logical decisions" (p. 34).

MINISTRY DOCUMENT #11

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Applied physics and technological science, grade 12, general level. Part 10. Toronto: Queen's Printer.

Stated Policy

In the Senior Divisions students "are provided with a specialized approach in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 4
Number of pages: 13 out of 60 or 22%
Environmental issues: 28

Environmental Statements: Qualitative

1. "The heat pollution of rivers and lakes is a cause for concern in some parts of the globe" (p. 19).
2. "A number of issues involved with the conservation, production, and distribution of electrical energy are subject to public debate " (p. 22).
3. "The nuclear industry has created situations in which the risks and benefits must be carefully examined and evaluated" (p. 30).

Environmental perspective: (1) 1976, (2) 1976, (3) 1976

Evaluation of statements:

Correct 1,2,3	Incorrect
Adequate	Inadequate 1,2,3
Impartial 1	Partial 2,3

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for grade 11 general level physics and technological science. Of the total 19 units only one optional unit "nuclear energy" deals with environmental issues and this unit is presented from the nuclear industry's point-of-view. The following two statements provide examples of this biased viewpoint: "Nuclear energy is an energy alternative in a time of rapidly diminishing fossil fuels, but one that requires a high initial investment of money" (p. 30), "An appreciation of the importance of employing suitable management techniques when dealing with nuclear wastes" (p. 29). The unit also recommends to get more information and guest speakers from Ontario Hydro and A.E.C.L.. Environmental groups are noticeable absent from these recommendations.

MINISTRY DOCUMENT #12

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Geology, grade 12, general and advanced levels. Part 11. Toronto: Queen's Printer.

Stated Policy

In the Senior Division students "are provided with a specialized approach in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 10
Number of pages: 16 out of 61 or 24%
Environmental issues: 8

Environmental Statements: Qualitative

1. "It is essential that toxic chemical and nuclear-waste-disposal sites in bedrock be chosen with caution" (p. 15).
2. "The earth is a small planet with a fragile environment" (p. 26).
3. "Decisions in favour of development as opposed to conservation of the environment may have significant geological impact" (p. 30).

Environmental perspective: (1) 1985, (2) 1972, (3) 1971

Evaluation of statements:

Correct	1,2,3	Incorrect	
Adequate	2	Inadequate	1,3
Impartial	1,2	Partial	3

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document outlines the core and optional units for grade 12 general and advanced geology. Little in the way of environmental issues are presented in either of the courses. Several units like "environmental geology," "the Great Lakes," and "ground water" have great potential to include environmental issues, but they fail to do so.

MINISTRY DOCUMENT #13

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Biology, grade 11, advanced level and the OAC. Part 12. Toronto: Queen's Printer.

Stated Policy

In the Senior Divisions students " are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 19
Number of pages: 15 out of 75 or 20%
Environmental issues: 21

Environmental Statements: Qualitative

1. "Society will need to support ongoing ecological research, pollution and natural-resources management, and environmental assessment and improvement programs if the deterioration of the environment is to be brought under control" (p. 65).
2. "Careers involving a knowledge of ecology include conservation officer, wildlife biologist, naturalist, forester, and surveyor" (p. 65).

Environmental perspective: (1) 1981, (2) 1987

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document outlines the core an optional units for the grade 11 advanced level, and OAC biology. Very little environmental content is presented in both courses. Most of the environmental issues are suggested under the heading "societal implications. This document recommends several government ministries as references for more environmental information, while environmental groups are totally ignored in this regard.

MINISTRY DOCUMENT #14

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Chemistry, grade 11, advanced level and the OAC. Part 13. Toronto: Queen's Printer.

Stated Policy

In the Senior Division students "are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 13
Number of pages: 15 out of 47 or 32%
Environmental issues: 21

Environmental Statements: Qualitative

1. "Some existing methods of handling and storing industrial and chemical wastes may pose a threat to the environment" (p. 15).
2. "A commitment to the wise use of the earth's finite resource" (p. 24).
3. "Scientists understand much of the chemistry of acid rain, but rectifying the problem involves value judgments" (p. 37).

Environmental perspective: (1) 1982, (2) 1972, (3) 1980

Evaluation of statements:				
	Correct	1,2	Incorrect	3
	Adequate	2	Inadequate	1,3
	Impartial	2	Partial	1,3

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document outlines the core an optional units for the grade 11 advanced level and OAC chemistry. None of the units in the two senior chemistry courses deal with environmental issues. Environmental issues are presented primarily under the topic of "societal implication". The core unit in grade 11 "Industry in Society" places more emphasis on technology than on the environment. This statement demonstrates this claim: "The purpose of this unit is to provide students with opportunities to consider their responsibilities as citizens in a technological society...and to understand the role played by a particular industry as it supplies products to satisfy the demands of society" (p. 23).

MINISTRY DOCUMENT #15

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Physics, grade 12, advanced level and the OAC. Part 14. Toronto: Queen's Printer.

Stated Policy

In the Senior Divisions students "are provided with a specialized approach, in which the science course deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 7
Number of pages: 15 out of 71 or 21%
Environmental issues: 29

Environmental Statements: Qualitative

1. "The thermal generation of electricity from fossil fuels or nuclear fuels is an important energy source. Society has to balance its needs for energy against the disadvantages of the waste products created and the possible depletion of non-renewable resources" (p. 23).
2. "A sense of social concern over the reality that technological applications of nuclear physics involve risks, which must be weighed against the benefits of nuclear technology to society" (p. 28).

Environmental perspective: (1) 1980, (2) 1980

Evaluation of statements:		
Correct 1,2	Incorrect	
Adequate	Inadequate	1,2
Impartial	Partial	1,2

Summary Assessment

Evaluation: Inconsistent with environmental perspective.

The document outlines the core and optional units for the grade 12 advanced level and OAC physics. Environmental issues are lacking in both documents, with the exception of the "nuclear physics" core unit in grade 12. Throughout the grade 12 course, some environmental issues are mentioned in the "societal implications" section of several units. In general, the two advanced senior physics courses lack environmental topics.

MINISTRY DOCUMENT #16

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Science in society OAC. Part 15. Toronto: Queen's Printer.

Stated Policy

In the Senior Division students "are provided with a specialized approach, in which the science courses deal with a single discipline at a time" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 21
Number of pages: 21 out of 27 or 78%
Environmental issues: 8

Environmental Statements: Qualitative

1. "Education may be needed to help people determine attitudes, policies, and lifestyles required for the maintenance of a healthy environment" (p. 17).
2. "Fact sheets available from government agencies, Universities or organizations such as Pollution Probe on selected topics from this unit should be obtained" (p. 18).

Environmental perspective: (1) 1976, (2) 1974

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document outlines the core and optional units for the OAC science in society. One of the core units "humans in the environment" deals entirely with environmental issues. This unit suggests the reader contact environmental groups like Pollution Probe. In another core unit "current issues in science," two of the three suggested topics to study deal with environmental concerns. In the aforementioned units, however, the issues are to be discussed from two viewpoints. The following statement is an example of what this means: "Describe several positive applications of nuclear energy...and describe the potential dangers of nuclear energy" (p. 20).

MINISTRY DOCUMENT #17

Publications Details

Ontario Ministry of Education. (1988). Geography: Intermediate and senior divisions. Part A. Policy and program expectations. Toronto: Queen's Printer.

Stated Policy

Students are expected to discover "knowledge about the earth, knowledge about the ways in which humans use the earth's resources and explain the spatial patterns that result from the interaction of people and their environment" (p. 5).

Environmental Statements: Quantitative

Term "environment" used: 13
Number of pages: 6 out of 38 or 16%
Environmental issues: 3

Environmental Statements: Qualitative

1. "Teachers should make clear that for many issues there is on single or simple solution" (p. 13).
2. "Geographic studies...to respond effectively and comfortably to future economic, social, political, and environmental issues" (p. 8).

Environmental perspective: (1) 1971, (2) 1972

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	2	Inadequate 1
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

This document describes the foundations of the geography curriculum and sets out the Ministry's expectations for geography programs. Very little environmental content is presented in the document, as shown in the quantitative statements. Perhaps this is due to the fact that the document does not provide many geographic examples to explain the different sections. In the section on planning, the document states the government's policy on sex equity, multiculturalism and a variety of other issues, but it altogether omits environmental topics.

MINISTRY DOCUMENT #18

Publications Details

Ontario Ministry of Education. (1988). Geography: Intermediate and senior divisions. Planning at the local level. Part B. Toronto: Queen's Printer.

Stated Policy

No policy exists for this document.

Environmental Statements: Quantitative

Term "environment" used: 2
Number of pages: 3 out of 54 or 6%
Environmental issues: 1

Environmental Statements: Qualitative

1. "The development of environmental responsibility and humanitarianism requires the investigation of questions, topics, and issues that are embedded in the content of each course" (p. 11).

Environmental perspective: (1) 1973

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document provides assistance for the planning of school programs, courses of study, and units of study. The aforementioned qualitative statement is one of two broad categories of affective aims. One may presume from this statement that the document would deal with environmental issues, but it does not. Many geographic examples are used in the document, thus making it quite possible to use environmental examples. The appendix on geographic skills does not mention the word environment.

MINISTRY DOCUMENT #19

Publications Details

Ontario Ministry of Education. (1988). Geography: The intermediate division program. Part C. Toronto: Queen's Printer.

Stated Policy

"The study of geography in the Intermediate Division involves an examination of people, their environments, and t h e interactions between them" (p. 2).

Environmental Statements: Quantitative

Term "environment" used: 14
Number of pages: 13 out of 56 or 23%
Environmental issues: 25

Environmental Statements: Qualitative

1. "Become aware of at least two different viewpoints on an environmental issue" (p. 17).
2. "Our military ties link us to other North Atlantic countries through NATO and to the U.S.A. through NORAD" (p. 44).
3. "Acid rain, radiation, and oil spills have no respect for international borders" (p. 55).

Environmental perspective: (1) 1971, (2) 1983, (3) 1987

Evaluation of statements:

Correct	1,2,3	Incorrect	
Adequate	1,3	Inadequate	2
Impartial	1,2,3	Partial	

Summary Assessment

Evaluation: Consistent with environmental perspective.

The document includes descriptions for geography courses in Grades 7 and 8, as well as the mandatory Canadian geography credit and an optional course on Eurasia for Grades 9 or 10. The environmental content is evenly split between the four courses. All four course descriptions use many geographic examples, but they omit using environmental examples. In the eight units of the compulsory Canadian geography course, for example, only one unit "natural resources," mentions environmental issues, but does so from a conservationist's viewpoint.

MINISTRY DOCUMENT #20

Publications Details

Ontario Ministry of Education. (1988). Geography: Intermediate and senior divisions. The senior division program, revised courses. Part D. Toronto: Queen's Printer.

Stated Policy

Senior Divisions should be build on the intermediate foundation, to be able to "provide students with a broad range of content to investigate and encourage them to become involved in a variety of new learning experiences" (p. 2).

Environmental Statements: Quantitative

Term "environment" used: 12
Number of pages: 15 out of 59 or 25%
Environmental issues: 18

Environmental Statements: Qualitative

1. "Investigate the effects of human activity on the atmosphere" (p. 10).
2. "Appreciate that the result of unwise uses of the natural environment can be human suffering" (p. 20).
3. "Study the effects of technological advances on the rate of modification of natural environments" (p. 21).

Environmental perspective: (1) 1987, (2) 1985, (3) 1980

Evaluation of statements:

Correct	1,2,3	Incorrect
Adequate	1,2,3	Inadequate
Impartial	1,2,3	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

This document includes descriptions of the following four Senior Division courses: Physical Geography, Human Geography, Regional Geography, and Urban Studies. The environmental content in all four courses is minimum. Much of the environmental content is presented in the Physical Geography section entitled "integrative studies," which "investigates the consequences for physical systems of human intervention e.g., offshore oil exploration, nuclear testing..." (p. 15).

MINISTRY DOCUMENT #21

Publications Details

Ontario Ministry of Education. (1988). Geography: Intermediate and senior divisions. The senior division program, new courses. Part E. Toronto: Queen's Printer.

Stated Policy

Senior Divisions should be built on the intermediate foundation, to be able to "provide students with a broad range of content to investigate and encourage them to become involved in a variety of learning experiences" (p. 2).

Environmental Statements: Quantitative

Term "environment" used: 56
Number of pages: 24 out o 48 or 50%
Environmental issues: 37

Environmental Statements: Qualitative

1. "Become aware of the many and varied career opportunities within the field of environmental studies" (p. 19).
2. "Identify and describe examples of unique but threatened natural environments in the world" (p. 29).

Environmental perspective: (1) 1987, (2) 1981

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

This document includes descriptions of the following three new Senior Division courses: Geographics, World Development, and Environmental Studies. The majority of the environmental content is found in the Environmental Studies course. Many environmental issues are presented in all sections of this course, ranging in topics from ecosystems to environmental management. The two other courses, which are completely new for the geography curriculum, contain very little environmental content.

MINISTRY DOCUMENT #22

Publications Details

Ontario Ministry of Education. (1988). Geography: Intermediate and senior divisions. The senior division program. Ontario academic courses. Part F. Toronto: Queen's Printer.

Stated Policy

"OAC studies should provide students with opportunities to acquire a substantial body of knowledge, in the light of which local, national, and international events can be viewed and assessed" (p. 2).

Environmental Statements: Quantitative

Term "environment" used: 32
Number of pages: 15 out of 30 or 50%
Environmental issues: 24

Environmental Statements: Qualitative

1. "The role of technology in modifying and managing environments: insecticides, herbicides, fertilizers, biological controls, disease control" (p. 11).
2. "Appreciate that individuals have a responsibility to conserve resources and protect the environment in and beyond Canada" (p. 28).

Environmental perspective: (1) 1979, (2) 1977

Evaluation of statements:		
Correct	1,2	Incorrect
Adequate	2	Inadequate 1
Impartial	1,2	Partial

Summary Assessment

Evaluation: Consistent with environmental perspective.

This document includes descriptions of the two geography OAC's: World Issues: Geographic Interpretations, and Canada: Environment and Economy. The environmental content is evenly distributed between the two courses but, in each, much of the environmental concerns are found only in one section of the course dealing primarily with the environment. Both courses are flexible enough to include significantly more environmental topics, especially the Canadian course entitled "Canada: Environment and Economy," but they do not.

APPENDIX C

ANALYSES OF MINISTRY TEXTBOOKS FROM CIRCULAR 14

This appendix contains the analysis of each Ministry Textbook. Each analysis is numbered, with numbers corresponding to the following list of texts that are analyzed.

	Name of Text	Grade	Course Code	Level
1.	Physical geography: A world perspective.	7		
2.	Cultural patterns in geography.	8		
3.	Canada: Land of diversity.	9/10	GCA	
4.	Across Canada: Resources and Regions.	9/10	GCA	
5.	Contact Canada.	9/10	GCA	
6.	The physical environment.	11/12		
7.	World geography: Sr. edition.	11/12		
8.	Heartland and hinterland.	OAC		
9.	World prospects: A contemporary study.	OAC		
10.	Focus on Science 7.	7		
11.	Science plus 7.	7		
12.	Focus on Science 8.	8		
13.	Science plus 8.	8		
14.	Health science connections 9.	9	SNC1A	
15.	Science: Ideas and applications 9.	9	SNC1A	
16.	Science explorations 10.	10	SNC2A	
17.	*Chemistry at work.	11		general
18.	Understanding chemistry.	11	SCH3A	
19.	Biology of ourselves: A study of human biology.	11	SBA3G	

20.	Physics: A practical approach.	12	SPH4G	
21.	Physics for a modern world.	12	SPH4A	advanced
22.	Fundamentals of physics: A senior course.	OAC	SPHOA	
23.	*Chemistry: A second course	OAC	SCHOA	
24.	Biology: Principles, patterns and processes.	OAC	SB1OA	

* Not yet on Circular 14.

Textbook #1

Publications Details

Goodfellow, G., Knox, D. & Smith, B.J. (1988). Physical geography: A world perspective. Toronto: Harcourt Brace Jovanovich.

Stated or Implied Purpose

None

Environmental Statements: Quantitative

Number of pages: 10 out of 188 or 5%
Number of chapters: 2 out of 6 or 33%
Number of illustrations: 15

Environmental Statements: Qualitative

Extinction.

1. "The koala faces extinction. Although there are many types of wild animals, some that used to exist are no longer found anywhere in the world. Dinosaurs, for instance, can no longer be found on the Earth" (p. 64).
2. "Wetlands in northern Ontario are threatened by acid rain pollution. In southern Ontario the survival of 10 000 remaining wetlands is also being threatened" (p. 152).

Environmental perspective: (1) 1978, (2) 1980

Evaluation of statements:

Correct	1,2	Incorrect
Adequate	1,2	Inadequate
Impartial	1,2	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:		
	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "Acid rain results from air pollution from smelters, electric power plants, home furnaces, and cars or trucks" (p . 148).

Environmental perspective: (1) 1980

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Summary Assessment

Evaluation: Extinction - consistent with environmental perspective.

Waste - consistent with environmental perspective.

Environmental content is severely limited in this text. Physical geography can and should involve environmental issues. The chapter on "keeping vital links" deals with environmental issues such as the loss of wetlands due to pollution created by man. The majority of the case studies such as "Collingwood, Ontario", "Humber River, Toronto" or "Aswan Dam, Egypt", ignore important environmental problems.

Textbook #2

Publications Details

Birchall, G. & O'Grady, L. (1988). Cultural patterns in geography. Toronto: Holt, Rinehart and Winston of Canada.

Stated or Implied Purpose

None

Environmental Statements: Quantitative

Number of pages: 15 out of 283 or 5%
Number of chapters: 6 out of 9 or 67%
Number of illustrations: 9

Environmental Statements: Qualitative

Extinction.

1. "The countries of the world spend about $750 billion per year on military forces" (p. 104).
2. "Today 20 percent more is spent on weapons to destroy life than on health care to preserve life" (p. 104).
3. "Nuclear missiles, and other military weapons,can bring destruction to any part of the globe" (p. 172).
4. "Scientist don't agree on what the world might be like after a major nuclear war" (p. 172).

Environmental perspective: (1) 1978, (2) 1978, (3) 1978, (4) 1982

Evaluation of statements:

Correct	1,2,3	Incorrect	4
Adequate	1,2,3	Inadequate	4
Impartial	1,2,3	Partial	4

Global Warming.

1. "The use of such energy sources (fossil fuels) results in air and water pollution" (p. 22).

Environmental perspective: (1) 1987

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Waste.

1. "The air above has been filled with soot, gases, and harmful chemicals. The fresh waters have been filled with the wastes of cities and industries" (p. 5).
2. "The old balance between society and its natural environment has been upset very drastically" (p. 22).

Environmental perspective: (1) 1987, (2) 1972

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - consistent with environmental perspective

The text dealt with many geographic topics in which environmental issues could have been discussed but it has failed to do so. The discussion of the loss of the Brazilian rain forest, for example, is limited only to the ways in which the culture of the Yanomami tribe is affected. The text, in presenting careers related to geography, does not mention "environmentalist".

Textbook #3

Publications Details

Clarke, B.W., & Wallace, John, K. (1989). Canada: Land of diversity. (2nd ed.). Scarborough, ON: Prentice Hall Canada.

Stated or Implied Purpose

The text examines many challenges that will face Canadians for their future existence and growth. These challenges will help the reader to understand his origins, nature, and scope.

Environmental Statements: Quantitative

Number of pages: 65 out of 506 or 13%
Number of chapters: 8 out of 38 or 21%
Number of illustrations: 31

Environmental Statements: Qualitative

Extinction.

1. "The ecosystem of the Far North are simple ones compared to those further south. Normally, if a food web is interrupted, most animals can find something else to eat. Here in the north when a species is wiped out, there is little else for its predators to eat. This interruption works its way right through the food web until it reaches the top" (p. 111).

Environmental perspective: (1) 1971

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

1. "The so-called greenhouse gases in the atmosphere absorb this heat, and trap it near the earth. As you see in Fig. 6-25, most of the gases are produced as by-products of our every day activities" (p.77).

Environmental perspective: (1) 1978

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial	1	Partial	

Waste.

1. "Nuclear plants have several advantages. In normal operation, they do not produce air pollution" (p. 371).
2. "As you might expect, there are disadvantages as well. The waste products of a nuclear plant remain dangerous for 100,000 years. Accidents can release radioactive material into the atmosphere" (p. 372).

Environmental perspective: (1) 1976, (2) 1985

Evaluation of statements:				
	Correct	2	Incorrect	1
	Adequate		Inadequate	1,2
	Impartial		Partial	1,2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The purpose of this text is to examine the challenges lying in the future for all Canadians. The lack of environmental issues in this text suggests that environmental concerns do not present serious problems which must be dealt with. With the exception of the chapter on energy, much of the environmental content is presented in an impartial manner. Much of the geographic information contained therein suggests implicitly that Canada is a country with few problems that need to be addressed. This thus undermines the purpose of the text.

Textbook #4

Publications Details

Hannell, C., & Harshman, R. (1987). Across Canada: Resources and regions. (2nd ed.). Toronto: John Wiley and Sons.

Stated or Implied Purpose

"One key objective of this text is to familiarize students with the natural resources of Canada and the need to manage them well. Since Canada is a country with vast resources that at one time seemed limitless, it is important that our next generation be aware of the limitations of our environment and the need to manage it wisely" (p. VII).

Environmental Statements: Quantitative

Number of pages: 39 out of 332 or 12%
Number of chapters: 8 out of 10 or 80%
Number of illustrations: 30

Environmental Statements: Qualitative

Extinction.

1. "Today there are about 28 endangered species. Any form of wildlife that is close to extinction is considered an endangered species" (p. 76).

Environmental perspective: (1) 1987

Evaluation of statements:			
	Correct	Incorrect	1
	Adequate	Inadequate	1
	Impartial	Partial	1

Global Warming.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "With modern pesticides to kill animal pests and herbicides designed to control weeds, the farmer has succeeded in countering these problems to some extent" (p. 155).
2. "The CANDU reactor was developed in Canada and is one of the most advanced in the world. Although the reactor has been very safe, there is concern about the escape of radioactivity" (p. 224).
3. "Pollution can be controlled, but the processes are expensive. Sometimes we cannot sell our products abroad because they cost more than those from another country" (p. 251).
4. "Dofasco and Stelco have installed very expensive equipment to reduce pollutants" (p. 290).

Environmental perspective: (1) 1980, (2) 1976, (3) 1987, (4) 1980

Evaluation of statements:	Correct	1,2,3,4	Incorrect	
	Adequate	4	Inadequate	1,2,3
	Impartial	3	Partial	1,2,4

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text stresses Canada's natural resources, but it does not do so from an environmental viewpoint. The text's purpose is to make students aware of the limitations of the environment, but it does not achieve this with its emphasis on the use of herbicide for farming and its praise for the CANDU reactor. Moreover, the text is apparently more concerned with the high cost of pollution equipment for factories than it is with the protection of the environment. The "Credits and Sources" (p. 332), is dominated by many large corporations and government agencies: environmental interests are omitted.

Textbook #5

Publications Details

Cartwright, F., & Pierce, G. (1988). Contact Canada. Toronto: Oxford University Press.

Stated or Implied Purpose

"Geography influences our lives in a variety of ways. Working through Contact Canada, you, as active learners, will gain a better understanding of and have a positive influence on your unique country" (p. 11).

Environmental Statements: Quantitative

Number of pages: 23 out of 428 or 5%
Number of chapters: 5 out of 21 or 24%
Number of illustrations: 17

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "Applications of weed sprays called herbicides, insect killers called insecticides, and artificial fertilizers have increased the yield per hectare. One farmer now produces enough to feed ninety people" (p. 92).
2. "Scientists are still studying the effects on humans of long-term exposure to these toxins. It maybe twenty years before they have the answers" (p. 127).
3. "CANDU reactors have an excellent performance and safety record. Very little pollution is produced" (p. 205).

Environmental perspective: (1) 1980, (2) 1979, (3) 1976

Evaluation of statements:	Correct	1	Incorrect	2,3
	Adequate		Inadequate	1,2,3
	Impartial		Partial	1,2,3

Summary Assessment

Evaluation: Waste: - inconsistent with environmental perspective

The text is limited in its treatment of environmental issues. Much of the environmental content is presented in chapter eleven on energy. The chapter on climate is of little use as major concerns such as the "greenhouse effect" are not mentioned. Unit three, "Resource Canada", is misleading as environmental issues are not emphasized. The text is somewhat negligent with its support for the use of chemicals in agriculture, with its statements that nuclear power provides very little pollution, and with its apparent concern with economic rather than environmental issues about to the mining of the tar sands.

Textbook #6

Publications Details

Inch, S.R., & Stone, W.G. (1982). The physical environment. (2nd ed.). Toronto: McGraw-Hill Ryerson.

Stated or Implied Purpose

None.

Environmental Statements: Quantitative

Number of pages: 12 out of 427 or 3%
Number of chapters: 10 out of 20 or 50%
Number of illustrations: 6

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

1. "It should be understood that, when considering the effect of the lower atmosphere on heating the earth, the analogy of the greenhouse should not be carried too far" (p. 275).

Environmental perspective: (1) 1979

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate		Inadequate	1
	Impartial		Partial	1

Waste.

1. "Because it is in demand like surface water, ground water is also exposed to the dangers of overuse and pollution" (p. 151).
2. "Pollution of ground water is a widespread problem" (p. 164).
3. "In 1970, the Ontario Ministry of the Environment approved Inco's plan to build a super-stack, 387m high, erroneously believing that the solution to pollution was dilution" (p. 355).

Environmental perspective: (1) 1986, (2) 1986, (3) 1980

Evaluation of statements:				
	Correct	1,2,3	Incorrect	
	Adequate	1,2	Inadequate	3
	Impartial	1,2	Partial	3

Summary Assessment

Evaluation: Global Warming: - inconsistent with environmental perspective.

Waste: - consistent with environmental perspective

The text does not include many environmental issues; this is especially so in the section of physical geography.

Textbook #7

Publications Details

Crewe, J.R., & Cave, L. (1984). World geography: Senior edition. Toronto: D.C. Heath Canada.

Stated or Implied Purpose

"Technology is advancing in response to expanding needs, it is our responsibility as passengers on Spaceship Earth to ensure that the delicate balance between human activities and ecosystems is maintained" (p. XIII).

Environmental Statements: Quantitative

Number of pages: 11 out of 488 or 2%
Number of chapters: 5 out of 17 or 29%
Number of illustrations: 4

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

1. "The damaging effect of air pollution cannot be overstated. Although low level pollution may go undetected for a long time, scientists have long suspected that it may very well have a serious effect on climatic conditions" (p. 69).

Environmental perspective: (1) 1987

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate		Inadequate 1
	Impartial	1	Partial

Waste.

1. "In other places, pollution by industry has destroyed fish stocks. The disappearance of the Atlantic salmon in some rivers of the northeastern United States is an example" (p. 71).
2. "It is estimated that a city of one million people may dispose of 350 million litres of organic sewage each day. The disposal of metallic and chemical wastes from industry in a city of that size may reach 3000t each day" (p. 104).

Environmental perspective: (1) 1986, (2) 1972

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Summary Assessment

Evaluation: Global Warming: - consistent with environmental perspective.
Waste: - consistent with environmental perspective

The text contains very little environmental content the purpose of the text is to provide "that delicate balance" between human activities and ecosystems. With an almost total lack of environmental content, however, the text does not provide that delicate balance.

Textbook #8

Publications Details

McCan, L.D. (Ed.). (1987). Heartland and hinterland. (2nd ed.). Scarborough, ON: Prentice-Hall.

Stated or Implied Purpose

"In this edition contributors were guided by the heartland-hinterland framework in their assessment of a region's geographic character. Each contributor examines the economic and social development of the region" (p. VII).

Environmental Statements: Quantitative

Number of pages: 5 out of 587 or 1%
Number of chapters: 3 out of 14 or 21%
Number of illustrations: 2

Environmental Statements: Qualitative

Extinction.

1. "Yet, it seems inevitable that large scale development in the North will eventually lead to reduced species diversity" (p. 511).

Environmental perspective: (1) 1987

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "Both 2,4,5-T and 2,4-D (Agent Orange) have been used on forests of Nova Scotia and New Brunswick in recent years. Individuals and community groups have objected, but control remains with the large, integrated produces and government bureaucrats who are battling the issue of short-term gain versus ecological balance" (p. 213).

Environmental perspective: (1) 1977

Evaluation of statements:	Correct	1	Incorrect	
	Adequate		Inadequate	1
	Impartial		Partial	1

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Waste: - consistent with environmental perspective

Environmental content is severely limited in this senior geography textbook.

Textbook #9

Publications Details

Molyneux, J. & MacKenize, M. (1987). World prospects: A contemporary study. (2nd ed.). Scarborough, ON: Prentice-Hall.

Stated or Implied Purpose

"The purpose of this book is to present as impartial analysis as possible of some of the world topics of major concern to many people" (p. 3).

Environmental Statements: Quantitative

Number of pages: 146 out of 444 or 33%
Number of chapters: 4 out of 8 or 50%
Number of illustrations: 30

Environmental Statements: Qualitative

Extinction.

1. "The world is finite, and most of the resources are not renewable" (p. 157).
2. "Over the world as a whole, degradation of non-industrial environments is a massive problem and its effects on the quality of life are severe" (p. 258).
3. "As a result of deforestation in the Himalyas, floods now affect 8 000 000ha more of northern India than before deforestation" (p. 260).

Environmental perspective: (1) 1972, (2) 1972, (3) 1989

Evaluation of statements:			
	Correct	1,2,3	Incorrect
	Adequate	1,2,3	Inadequate
	Impartial	1,2,3	Partial

Global Warming.

1. "Since 1850 the carbon dioxide in the air has increased by about 15%, largely through the burning of coal and the destruction of forest" (p. 200).
2. "The ramifications of the greenhouse effect are not full known" (p. 200).

Environmental perspective: (1) 1980, (2) 1989

Evaluation of statements:				
	Correct	1	Incorrect	2
	Adequate	1	Inadequate	2
	Impartial	1	Partial	2

Waste.

1. "Unlike coal-powered generating stations, nuclear stations are relatively clean. Nuclear stations do not emit pollutants" (p. 204).
2. "The seriousness of the dioxin problem is still a matter of scientific debate" (p. 264).

Environmental perspective: (1) 1976, (2) 1977

Evaluation of statements:			
	Correct	Incorrect	1,2
	Adequate	Inadequate	1,2
	Impartial	Partial	1,2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The environmental content in the text is presented in an impartial way. Most of the environmental data was correct and adequate. However, the text also presents environmental statements that undermine the credibility of the environmental content of the text and are therefore evaluated as inadequate. For example nuclear power does emit pollutants, dioxins are a serious environmental concern and the ramifications of the greenhouse effect are well known.

Textbook #10

Publications Details

Flanagan, F.J., Christopher, J.H., & Hague, S.J. (1987). Focus on science 7 (2nd ed.). Toronto: D.C. Heath Canada.

Stated or Implied Purpose

"Focus on Science 7 aims to help you become more aware o the nature of science and the impact it has on your life" (p. VIII).

Environmental Statements: Quantitative

Number of pages: 37 out 405 or 9%
Number of chapters: 5 out of 7 or 71%
Number of illustrations: 37

Environmental Statements: Qualitative

Extinction.

1. "Many individuals are concerned about the gradual disappearance of natural habitants such as forests and wetlands" (p. 131).
2. "The extinction of plant species is a serious problem" (p. 361).
3. "Plants and their natural environments are very important to us" (p. 361).

Environmental perspective: (1) 1987, (2) 1989, (3) 1980

Evaluation of statements:

Correct	1,2,3	Incorrect
Adequate	1,2,3	Inadequate
Impartial	1,2,3	Partial

Global Warming.

1. "Some scientist believe that the risk of altering the naturalclimate by increasing the amount of carbon dioxide in the atmosphere is too great. They believe we must try to find alternatives to burning fossil fuels for energy" (p. 329).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial	1	Partial	

Waste.

1. "The tubes of radioactive fuel which have done their job for 18 months, are replaced by fresh tubes. This is much like replacing the weak batteries in a flashlight" (p. 185).
2. Ontario Hydro engineers said "It was much cheaper to use a nuclear reactor and generate all this energy in one place" and "Overhead wires was the cheapest and most direct method" (p. 251).

Environmental perspective: (1) 1976, (2) 1976

Evaluation of statements:				
	Correct	1	Incorrect	2
	Adequate		Inadequate	1,2
	Impartial		Partial	1,2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text examines very few environmental issues. The chapter on "Uses of Energy and its Conservation" has 28 pages that deal more with energy than the environment. Pages 16 and 17 discuss several standard scientific fields such as physics and chemistry; environmental science, however, is totally omitted. The text provides a good explanation of acid rain and the greenhouse effect, but controversial environmental issues are left to be debated elsewhere.

Textbook #11

Publications Details

Morrison, E.S. (1988). Science plus 7. Toronto: Harcourt Brace Jovanovich.

Stated or Implied Purpose

"To prepare young people for a new and challenging age" (p. VI).

Environmental Statements: Quantitative

Number of pages: 33 out of 375 or 8%
Number of chapters: 3 out of 6 or 50%
Number of illustrations: 33

Environmental Statements: Qualitative

Extinction.

1. "Extinction is a process that generally happens over a long time" (p.322).

Environmental perspective: (1) 1981

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

1. "Chemical changes, although very useful, can sometimes also produce hazardous materials. The sulphur dioxide gas that result from the smelting of ores is an example" (p. 225).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial	1	Partial	

Waste.

1. "Some wastes can be incinerated, producing safe carbon dioxide and water vapour" (p. 225).
2. "Thanks to our climate, Canadians spend a lot of money heating their homes" (p. 270).
3. "In a nuclear reactor we can control this breakdown" (p. 283).

Environmental perspective: (1) 1978, (2) 1983, (3) 1976

Evaluation of statements:				
	Correct	2,3	Incorrect	1
	Adequate	2	Inadequate	1,3
	Impartial	2	Partial	1,3

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

This textbook presents very few environmental issues. The chapter on "Energy and You" has 27 pages that deal almost wholly with energy issues rather than specific topics related to the environment. The text refers to several environmental groups, but does so only marginally (ie. Pollution Probe, a major environmental organization, is mentioned only once -- on the last page of the text). The most notable contribution the text offers to the study of the environment is a published letter from an environmental science class to the Provincial Select Committee on Energy.

Textbook #12

Publications Details

Flanagan, F.J. & Hague, S.J. (1989). Focus on Science. (2nd ed.). Toronto: D.C. Heath Canada.

Stated or Implied Purpose

"Focus on Science 8 aims to help you become more aware of science and the impact it has on your life" (p. VIII).

Environmental Statements: Quantitative

Number of pages: 24 out of 395 or 6%
Number of chapters: 6 out of 7 or 8%
Number of illustrations: 18

Environmental Statements: Qualitative

Extinction.

1. "Today, four out of five species are endangered species as a result of rapid changes in their environments" (p. 341).
2. "Petroleum refining and ore smelting produce sulphur dioxide, resulting in pollution that kills lichens, an important food source for caribou" (p. 318).

Environmental perspective: (1) 1989, (2) 1979

Evaluation of statements:

Correct	1,2	Incorrect
Adequate	1,2	Inadequate
Impartial	1,2	Partial

Global Warming.

1. "Heat transfers are also a major cause of pollution. The air above cities stays unnaturally warm all year" (p. 282).
2. "Machines make work easier and give you more leisure time to do the things you enjoy doing. However, many pollution problems have been linked to the use of machines" (p. 169).

Environmental perspective: (1) 1970, (2) 1974

Evaluation of statements:				
	Correct	1,2	Incorrect	
	Adequate	1,2	Inadequate	
	Impartial	1,2	Partial	

Waste.

1. "One of the most effective treatments for hazardous wastes is incineration" (p. 113).
2. "The CANDU reactor has proven to be very reliable and safe ot operate" (p. 249).
3. "The result is a steady accumulation of toxic substances in a variety of environments that endanger both wildlife and human populations" (p. 347).

Environmental perspective: (1) 1987, (2) 1976, (3) 1970

Evaluation of statements:				
	Correct	3	Incorrect	1,2
	Adequate	3	Inadequate	1,2
	Impartial	3	Partial	1,2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text does not examine many environmental issues. As stated in the introduction, issues are presented and explored from a positive and negative viewpoint so as to develop skills in critical thinking. The text for some issues explores both sides; but for other issues, such as nuclear power and the incineration of hazardous wastes, this is not done.

Textbook #13

Publications Details

Morrison, E.S. (1988). Science plus 8. Toronto: Harcourt Brace Jovanovich.

Stated or Implied Purpose

"To prepare young people for a new an challenging age" (p. VI).

Environmental Statements: Quantitative

Number of pages: 37 out of 416 or 9%
Number of chapters: 5 out of 6 or 83%
Number of illustrations: 33

Environmental Statements: Qualitative

Extinction.

1. "The thought of nuclear war is horrifying" (p. 236).
2. "They began to fear that the climate of our planet might be changed dramatically by the dust produced by the explosions and the smoke from tremendous fires. Scientist gave these effects the name 'nuclear winter'" (p. 236).
3. "Survival means thoughtful, careful interactions between human beings and all parts of the environment-living, once-living, and nonliving" (p. 391).

Environmental perspective: (1) 1978, (2) 1984, (3) 1980

Evaluation of statements:

Correct	1,2,3	Incorrect
Adequate	1,2,3	Inadequate
Impartial	1,2,3	Partial

Global Warming.

1. "One result is that the amount of carbon dioxide in the air has also increased. Some scientists are afraid that this could, in turn, increase the Greenhouse Effect and cause overheating of the Earth. This is a controversial issue" (p. 225).

Environmental perspective: (1) 1980

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate		Inadequate 1
	Impartial		Partial 1

Waste.

1. "The insecticide DDT has been banned in most countries" (p. 347).
2. "Our coastlines and wildlife are sometimes harmed by oil slicks" (p. 15).

Environmental perspective: (1) 1970, (2) 1987

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1	Inadequate 1
	Impartial	1	Partial 2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - consistent with environmental perspective

Several common environmental concepts such as DDT and acid rain are examined from a strongly based environmental viewpoint. The environmental issues, of which there are few in number, are often presented in the form of a question such as "What is your opinion on nuclear energy" (p. 283). The text is not very forceful in the wording of environmental issues, for statements such as oil slicks "sometimes" harm wildlife or that global warming is still a "controversial issue."

Textbook #14

Publications Details

Candido, J.L., James, E.S., & Phillips, R.E. (1987). Health Science connections 9. Toronto: D.C. Heath Canada.

Stated or Implied Purpose

"Science is a way of gaining knowledge and understanding of our natural world. The desire to know how or why something happens is the driving force behind all scientific inquiry" (p. IX).

Environmental Statements: Quantitative

Number of pages: 23 out of 638 or 4%
Number of chapters: 7 out of 19 or 37%
Number of illustrations: 16

Environmental Statements: Qualitative

Extinction.

1. "Plants are also becoming extinct, and at a very fast rate. Since 1500, two hundred animal species have been lost, but twice that number of plant species is lost every year. By one estimate, more than 40 000 species of plants will be extinct by the year 2000. The main cause of plan extinction is human population" (p. 477).

Environmental perspective: (1) 1989

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

1. "The burning of fossil fuels in industry, homes, and millions of cars on the roads has raised the level of carbon dioxide in the atmosphere. Carbon dioxide traps heat energy in the atmosphere. Scientist, predict that increased carbon dioxide in the air will lead to a warming of the earth's surface. This is called the greenhouse effect" (p. 482).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial	1	Partial	

Waste.

1. "2,4-D is a herbicide that kills only broad-leave plants. Many home owners use it on their lawns to kill dandelions and other weeds" (p. 547).
2. "The increasing use of chemical fertilizers and pesticides may have serious long-term effects on the environment" (p. 548).
3. "Canada has been a leader in researching the use of radiation to preserve many different kinds of food" (p. 581).

Environmental perspective: (1) 1977, (2) 1977, (3) 1986

Evaluation of statements:				
	Correct	1,2,3	Incorrect	
	Adequate	3	Inadequate	1,2
	Impartial	2,3	Partial	1

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - consistent with environmental perspective

This text has limited environmental content. The author succeeds in presenting it from an impartial viewpoint. In the science related career sections the text describes two environmental careers. The text's treatment of pesticides is perhaps too lenient for it states that pesticides "may" have serious long-term effects on the environment. Most of the environmental issues such as food irradiation, nuclear power, and toxic chemicals are presented in technical scientific terms. Many of the topics presented in the text such as "pulp and paper production" do not mention environmental issues.

Textbook #15

Publications Details

Lang, M.H., & Finucane, U.E.R. (1988). Science: Ideas and applications 9. Toronto: John Wiley & Sons.

Stated or Implied Purpose

"Our textbooks are designed to provide a general introduction to science that will help students prepare for their role as citizens in an increasingly technological society" (p. VII).

Environmental Statements: Quantitative

Number of pages: 23 out of 402 or 6%
Number of chapters: 6 out of 21 or 29%
Number of illustrations: 13

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

1. "Excess carbon dioxide in the atmosphere can act like a blanket, trapping heat that would usually escape rom the earth's atmosphere. This trapping of heat occurs in the same way as a greenhouse traps heat. Because..., this warming effect is called the greenhouse effect" (p. 155).

Environmental perspective: (1) 1980

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Waste.

1. "Large-scale industrial waste chemicals are concentrated and come in large quantities from identified locations. Thus they are in many ways easier to deal with than the wastes produced by individual people" (p. 131).
2 "Each province...has inspectors who make sure that the level of harmful gases in the air stays within safe limits. The limits are set by the governments we elect" (p. 156).
3. "Herbicides can also be used with care" (p. 304).

Environmental perspective: (1) 1982, (2) 1982, (3) 1977

Evaluation of statements:			
	Correct	1,2,3	Incorrect
	Adequate	1,2	Inadequate 3
	Impartial	1	Partial 2,3

Summary Assessment

Evaluation: Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text makes a number of contentious claims: with the implementation of government standards, the citizens' protection is assured; herbicides and pesticides are safe and effective, provided they are used as directed; irrigation can only improve the growth of plants. The text supports natural insecticides like rotenone and pyrethrum.

Textbook #16

Publications Details

Hirsch, A.J., Czerneda, J.E., Galbraith, D.I., Garden, J.E., & Plumb, P.A. (1987). Science explorations 10. Toronto: John Wiley & Son.

Stated or Implied Purpose

"We have strived to help students understand basic concepts and processes of science, at the same time aiding them in developing essential skills. Likewise, we have tried to help them recognize the achievements of scientists and engineers, and to see the relevance of science in their everyday lives" (p. 11).

Environmental Statements: Quantitative

Number of pages: 81 out of 582 or 14%
Number of chapters: 12 out of 23 or 52%
Number of illustrations: 50

Environmental Statements: Qualitative

Extinction.

1. "Although we are learning more about the consequences of our actions, we are unable to interact with ecosystems in such a way as to keep them in perfect balance. One sign of this is the number of organisms that are threatened with extinction" (p. 74).
2. "It is estimated that today, on a worldwide basis, one species a day is becoming extinct. Most of these extinctions are the result of the destruction of habitat" (p. 76).

Environmental perspective: (1) 1972, (2) 1989

Evaluation of statements:			
	Correct	1,2	Incorrect
	Adequate	1,2	Inadequate
	Impartial	1,2	Partial

Global Warming.

1. "The greenhouse effect occurs in the Earth's atmosphere as well. Even a minor resulting increase in temperature could have serious effects on our planet" (p. 416).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial		Partial	1

Waste.

1. "Pesticides, at first, provide a rapid reduction in the numbers of a pest, but they are not a long-term solution" (p. 83).
2. "Transmission of electrical energy also causes major difficulties" (p. 366).
3. "Currently incineration is the most common method of waste disposal used by large cities in Canada. The heat given off by this process can be used for other purposes..." (p. 532).
4. "An industrial hazardous waste treatment plant is being developed by the OWMC, where hazardous wastes...will be disposed of by massive incinerators" (p. 551).

Environmental perspective: (1) 1987, (2) 1983, (3) 1982, (4) 1982

Evaluation of statements:				
	Correct	1,2,4	Incorrect	3
	Adequate	1,2	Inadequate	3,4
	Impartial	1,2	Partial	3,4

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - inconsistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text has an excellent environmental unit on "Waste Management". This two chapter unit contains more than 60 percent of the environmental information in the text. One purpose of the text is to recognize the achievement of scientists and engineers. Environmentalists are included in the 14 careers mentioned in the text. Some of the text's environmental issues emphasize the views of industries alone. Principally these include Ontario Hydro's view on nuclear power and the OWMC, which supports the burning of toxic wastes. The "Photo Credits" consists mainly of corporations or government agencies; no environmental groups are represented. In the acknowledgements the "Waste Management" unit was organized by the Technical Services Laboratories.

Textbook #17

Publications Details

Shapiro, B., & Shapiro, S. (1989). Chemistry at work. Toronto: Copp Clark Pitman.

Stated or Implied Purpose

"At long last we have been able to put in print our philosophy of how applied chemistry can be taught so as to make it more personal and exciting for learners " (p. 12).

Environmental Statements: Quantitative

Number of pages: 17 out of 432 or 4%
Number of chapters: 4 out of 16 or 25%
Number of illustrations: 21

Environmental Statements: Qualitative

Extinction.

1. "The major world powers have many nuclear weapons and are producing more. The threat of nuclear war is very real" (p. 410).

Environmental perspective: (1) 1978

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "In 1985 in British Columbia, about 140 people vomited, and had diarrhea and dizziness after eating Long English Cucumbers. Laboratory tests showed that cucumbers from the company contained traces of an organic pesticide, aldicarb. This pesticide is restricted by law to use on potatoes and beets" (p. 380).
2. "Many people believe that irradiation is a good alternative to the addition of chemical preservatives in foods. Some people are against the practice" (p. 415).

Environmental perspective: (1) 1971, (2) 1974

Evaluation of statements:	Correct 1	Incorrect 2
	Adequate 1	Inadequate 2
	Impartial 1	Partial 2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

This textbook contains very little environmental content. More than three quarters of the environmental content is found in the chapter "Nuclear Chemistry". This chapter is presented from a pronuclear point-of-view. Most Canadians for example, are opposed to food irradiation, yet the text supports the irradiation of food.

Textbook #18

Publications Details

Bruckman, H.J., & Cruickshanks, A. (1988). Understanding chemistry. Toronto: John Wiley & Sons.

Stated or Implied Purpose

"One very important function of this textbook is to present the basic principles, concepts and theories of chemistry as part of a framework necessary to explain observations" (p. XII).

Environmental Statements: Quantitative

Number of pages:	46 out of 541 or 9%
Number of chapters:	11 out of 18 or 61%
Number of illustrations:	23

Environmental Statements: Qualitative

Extinction.

1. "it is easy to blame science and/or technology for many of the problems of modern society, such as the threat of nuclear weapons...But is this fair? Very often, the same scientific discovery can lead to totally different outcomes. Consider the discovery that the fission of a uranium 235 atom releases large amounts of energy. This has led to...atomic bombs and thus the potential for nuclear warfare. However, this...development of nuclear reactors, which now produce a significant percentage of the world's energy needs" (p. 390).

Environmental perspective: (1) 1978

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial		Partial	1

Global Warming.

1. "Because freons take several years, perhaps as long as two years, to reach the stratosphere, it is difficult to prove or disprove the effect of these compounds on the ozone layer" (p. 447).

Environmental perspective: (1) 1978

Evaluation of statements:			
	Correct	Incorrect	1
	Adequate	Inadequate	1
	Impartial	Partial	1

Waste.

1. "Although no aluminum ore is mined in Canada, the availability of large quantities of inexpensive hydroelectric power make aluminum an ideal structural material for products...recyclable food container..." (p. 75).
2. "Executives of companies found guilty of polluting the environment have been sentenced to prison terms for continued abuse of the law and of the environment" (p. 398).
3. "As with other technologies, nuclear technology is neither inherently good or bad. Its beneficial application in energy production...is balanced against the serious problems associated with there uses" (p. 501).

Environmental perspective: (1) 1980, (2) 1983, (3) 1979

Evaluation of statements:			
	Correct	1	Incorrect 2,3
	Adequate		Inadequate 1,2,3
	Impartial		Partial 1,2,3

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - inconsistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The text makes a number of factually incorrect claims: it states that hydroelectric power is inexpensive, but this is not true; the text implies that freon does not harm the ozone layer, yet scientists have established that this is not true; the test states that executives of some companies that pollute are imprisoned, yet this rarely happens.

Textbook #19

Publications Details

Berry, G.S. (1982). Biology of ourselves: A study of human biology. Toronto: John Wiley & Sons.

Stated or Implied Purpose

"This book is an invitation to look at yourself, to get to know you. The human body is, in most cases, a mystery to its owner" (p. 6).

Environmental Statements: Quantitative

Number of pages: 0
Number of chapters: 0
Number of illustrations: 0

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

None.

Environmental perspective:

Evaluation of statements:	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Summary Assessment

Evaluation:

This text contained no environmental content. Many of the topics could have been discussed from an environmental viewpoint, but are not.

Textbook #20

Publications Details

Hirsch, A.J. (1981). Physics: A practical approach. Toronto: John Wiley & Son.

Stated or Implied Purpose

"Physics is the study of matter and energy and the interaction between matter and energy" (p. VII).

Environmental Statements: Quantitative

Number of pages: 7 out of 483 or 2%
Number of chapters: 2 out of 25 or 8%
Number of illustrations: 0

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:		
	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

None.

Environmental perspective:

Evaluation of statements:		
	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Waste.

1. "Probably the greatest problem facing the nuclear industry is what to do with the waste products from the fission reactions. Some of the waste products are highly radioactive and have long half-lives. Scientist have short-term solutions to this problem, but they are searching for a long-term solution" (463).

Environmental perspective: (1) 1985

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial		Partial	1

Summary Assessment

Evaluation: Waste: - consistent with environmental perspective

This textbook omits environmental content. Many topics in the text could include environmental topics.

Textbook #21

Publications Details

Hirsch, A.J. (1986). Physics for a modern world. Toronto: John Wiley & Sons.

Stated or Implied Purpose

"Meeting the challenge of studying physics will give you a better understanding of what occurs in the world around you, and will enable you to learn to adapt to an ever changing world" (p. XII)

Environmental Statements: Quantitative

Number of pages: 47 out of 642 or 7%
Number of chapters: 3 out of 23 or 13%
Number of illustrations: 46

Environmental Statements: Qualitative

Extinction.

1. "There are many moral, political, economic, and philosophiical questions related to the arms race. Only informed and caring citizens can make wise judgments about factors that affect all of us" (p. 601)

Environmental perspective: (1) 1983

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

1. "In fact, the Athabasca Tar Sands is the site of the largest mining operation in the world. This all sounds impressive, but there are numerous problems to overcome before the tar sands can be minded efficiently" (p. 158).

Environmental perspective: (1) 1977

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial		Partial	1

Waste.

1. "The nuclear reactor debate cannot be solved here, but we can analyze it objectively" (p. 589).
2. "Clearly, there are both advantages and disadvantages to generating electricity using nuclear reactors" (p. 593).

Environmental perspective: (1) 1976, (2) 1979

Evaluation of statements:				
	Correct	1,2	Incorrect	
	Adequate		Inadequate	1,2
	Impartial		Partial	1,2

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

"Without physics, almost nothing we have in our modern world would have advanced to its present stage" (p. XI). Since physics is the study of matter and energy, many of the text's topics could have been dealt with from an environmental perspective. The text, instead, dealt with most of the issues purely from a technical point of view. The few environmental issues that are discussed are presented in an impartial manner in most cases.

Textbook #22

Publications Details

Martindale, D.G., Heath, R.W., & Eastman, P.C. (1988). Fundamentals of physics: A senior course. Toronto: D.C. Heath Canada.

Stated or Implied Purpose

"It has been the authors' intent to make the book readable and interesting, while at the same time providing a through examination of basic physical concepts. The book also includes applications that give insight into the relevance of physics in our modern, technological world" (p. X).

Environmental Statements: Quantitative

Number of pages: 1 out of 825 or .1%
Number of chapters: 1 out of 20 or 5%
Number of illustrations: 1

Environmental Statements: Qualitative

Extinction.

None.

Environmental perspective:

Evaluation of statements:		
	Correct	Incorrect
	Adequate	Inadequate
	Impartial	Partial

Global Warming.

1. "As pollution levels in the Earth's atmosphere increase, the Earth may become like a gigantic greenhouse" (p. 659).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate		Inadequate	1
	Impartial		Partial	1

Waste.

None.

Environmental perspective:

Evaluation of statements:				
	Correct		Incorrect	
	Adequate		Inadequate	
	Impartial		Partial	

Summary Assessment

Evaluation: Global Warming: - consistent with environmental perspective.

This textbook contains no environmental content. A text that provides a thorough examination of basic physical concepts, perhaps should include some mention of environmental issues.

Textbook #23

Publications Details

Rayner, Canham, G., Fisher, P., LeCouteur, P., & Raap, R. (1989). Chemistry: A second course. Don Mills, ON: Addison-Wesley.

Stated or Implied Purpose

"Chemistry is a very relevant subject. A knowledge of chemistry helps us to interpret and understand some of the larger environmental issues of the day, such as destruction of the ozone layer and the build-up of the greenhouse effect. It can also help us make decisions about the many chemical products we use around the home and at work. To be able to make informed judgments concerning the use of these products, we often need to understand some of the basic principles of chemistry. Introducing the student to these basic principles is one of the main goals of this text" (p. X).

Environmental Statements: Quantitative

Number of pages: 25 out of 759 or 3%
Number of chapters: 6 out of 15 or 40%
Number of illustrations: 35

Environmental Statements: Qualitative

Extinction.

1. "The effects of nuclear warfare would be disastrous. The total explosive power of existing nuclear weapons is great enough to destroy the world several times over" (p. 593).

Environmental perspective: (1) 1982

Evaluation of statements:			
	Correct	1	Incorrect
	Adequate	1	Inadequate
	Impartial	1	Partial

Global Warming.

1. "The destruction of a proportion of the ozone layer by CFC's would lead to an increase in ultraviolet light reaching the earth's surface and consequently an increase in skin cancer from this high-energy radiation" (p. 277).

Environmental perspective: (1) 1980

Evaluation of statements:				
	Correct	1	Incorrect	
	Adequate	1	Inadequate	
	Impartial	1	Partial	

Waste.

1. "Dry cleaning may seem to be the answer for removing the soup stains from a pleated wool skirt, but the process also raises concerns" (p. 345).
2. "The Canadian government now refuses to sell CANDU reactors to any country that it feels is likely to use plutonium for military purposes" (p. 586).
3. "Thus a natural extension of our technological expertise would be to similarly market food irradiation units" (p. 592).
4. "When pure, 2,4-D and 2,4,5-T are comparatively harmless" (p. 686).

Environmental perspective: (1) 1983, (2) 1976, (3) 1974, (4) 1971

Evaluation of statements:				
	Correct	1,3	Incorrect	2,4
	Adequate	1	Inadequate	2,3,4
	Impartial	1	Partial	2,3,4

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

The preface of the text stated that a knowledge of chemistry "would help to interpret and understand some of the larger environmental issues of the day" (p. X). The text is very weak on environmental issues. Some of the environmental views are partial such as the statement that "pure 2,4-D and 2,4,5-T are comparatively harmless" (p. 686). Moreover, other contentious issues include its support for food irradiation and its claim that the Canadian government controls its export sales of CANDU reactors.

Textbook #24

Publications Details

Galbraith, D. (1989). Biology: Principle, patterns, and processes. Toronto: John Wiley and Sons.

Stated or Implied Purpose

"Biology: Principles, Patterns, and Process is a text designed to provide a solid foundation of knowledge and insight into the study of biology at the senior level" (p. ix).

Environmental Statements: Quantitative

Number of pages: 44 out of 634 or 7%
Number of chapters: 12 out of 28 or 43%
Number of illustrations: 18

Environmental Statements: Qualitative

Extinction.

1. "It is paradoxical that a simple nuclear transformation like the conversion of four atoms of hydrogen to one atom of helium can be one of the most destructive forces known to humans and yet, at the same time, it the very source of energy upon which life is so dependent" (p. 141).
2. "This pollution is decreasing the environment's carrying capacity for human life" (p. 561).
3. "yet the threat remains that nuclear conflict might destroy all life on earth, either through the massive physical destruction of the initial deterioration or through the subsequent poisoning of life with radiation" (p. 591).

Environmental perspective: (1) 1986, (2) 1989, (3) 1984

Evaluation of statements:

Correct	1,2,3	Incorrect
Adequate	1,2,3	Inadequate
Impartial	1,2,3	Partial

Global Warming.

1. "Since World War II, over half of the world's humid forests have been destroyed" (p. 51).
2. "Another way of considering the Second Law of Thermodynamics is to recognize that energy have a tendency to change from a concentrated and ordered form to a dispersed and disordered form. This recognition leads to the concept of entropy..." (p. 531).
3. "Many scientist believe that the increased level of carbon dioxide will result...greenhouse effect" (p. 541).

Environmental perspective: (1) 1989, (2) 1980, (3) 1980

Evaluation of statements:

Correct	1,2,3	Incorrect	
Adequate	1,2,3	Inadequate	
Impartial	1,2,3	Partial	

Waste.

1. "Chemical herbicides have become an essential component of modern agriculture but their value simply as a labour saving device must be carefully weighed against potentially harmful side-effects" (p. 150).
2. "Because landfill sites are increasingly difficult to obtain...municipalities are now destroying waste through high temperature incineration. This method does reduce pollution considerably and leaves a much smaller quantity of ash" (p. 546).
3. "The ecological impacts of atomic power generation are not fully understood" (p. 589).

Environmental perspective: (1) 1980, (2) 1987, (3) 1976

Evaluation of statements:

Correct	1	Incorrect	2,3
Adequate	1	Inadequate	2,3
Impartial	1	Partial	2,3

Summary Assessment

Evaluation: Extinction: - consistent with environmental perspective.
Global Warming: - consistent with environmental perspective.
Waste: - inconsistent with environmental perspective

With the exception of the last 100 pages (last unit), environmental content is limited in the text. The text may have

included a great deal more environmental content, but it does not. The "Biotic Network," for example, which describes the terrestrial biomes, omits the important topic of environmental degradation. Also, the environmental issues that are present in the text, present a conflicting contradictory message. The text focuses on issues of concern such as DDT, mercury pollution, acid rain, nuclear war, and the burning of tropical forest to provide inexpensive hamburgers for North America. Conversely, however, the text favours the incineration of garbage, and is apparently not seriously concerned about nuclear power, pesticides or insecticides. Moreover, the text does not use "entropy" as a viable means of solving the world's energy problems.

APPENDIX D

RATING VALIDATION

This appendix contains the analysis of materials used in determining rating validation. The numbers identifying the materials analyzed in the determination of rating validation correspond to those used in Appendix B (Ministry Documents) and Appendix C (Ministry textbooks).

The analysis of the rating validation was completed by:

Science Head - Document #14
- Text #18

Geography Teacher - Document #19
- Text #3

Environmentalists - Document #15
- Texts #20, 21

MINISTRY DOCUMENT #14

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Chemistry, grade 11, advanced level and the OAC. Part 13. Toronto: Queen's Printer

Stated Policy

Environmental Statements: Quantitative

Term "environment" used: 19
Number of pages: 12 out of 47 or 26%
Environmental issues: 28

Environmental Statements: Qualitative

1. "Chemical processes may result in contamination of the environment" (p.13).
2. "Radioactive isotopes can pose disposal problems, some more serious that others" (p. 15).
3. "Citizens receive the benefits from chemical industries and accordingly, must share the responsibility for helping to diminish the accompanying social and environmental problems" (p.14).

Evaluation.	Correct 1, 2, 3	Incorrect
	Adequate 1, 3	Inadequate 2
	Impartial 1, 2, 3	Partial

Summary Assessment

A science-technology society emphasis is supposed to be integrated into all new science courses (including environmental issues). This is addressed in some measure in both SCH 3A and SCH OAC courses, however, it is interesting to note that the core unit objectives are not too prescriptive in this area. By and large, it is left to each individual teacher to find time to increase student awareness of societal implications and applications.

MINISTRY DOCUMENT # 15

Publications Details

Ontario Ministry of Education. (1987). Science: Intermediate and senior divisions. Physics, grade 12, advance level and the OAC Part 14. Toronto: Queen's Printer.

Stated Policy

Environmental Statements: Quantitative

Term "environment" used: 6
Number of pages: 13 out of 71 or 18%
Environmental issues: 21

Environmental Statements: Qualitative

1. "Long-distance power transmission lines can be extremely hazardous because of their high voltages; in addition, they require large amounts of land and are unsightly. These factors create issues for debate in regard to energy needs and distribution" (p.23).

Evaluation.

Correct 1	Incorrect
Adequate	Inadequate 1
Impartial 1	Partial

Summary Assessment

The document places heavy emphasis on the impractibility of life without a steady source of electricity. (This could have been dictated by Ontario Hydro). The section on "electromagnetic radiation" in the ministry brochure lists a number of benefits for radiation, but except for a reference to excessive suntanning, omits any reference to harmful effects of ionizing or non-ionizing radiation - a sad omission.

MINISTRY DOCUMENT #19

Publications Details

Ontario Ministry of Education. (1988). Geography: The intermediate division program. Part C. Toronto: Queen's Printer.

Stated Policy

Environmental Statements: Quantitative

Term "environment" used: 12
Number of Pages: 11 out of 56 or 20%
Environmental issues: 20

Environmental Statements: Qualitative

1. "Identify ways in which people can improve or degrade the environment" (p.8).
2. "Develop an awareness of the need for environmental balance and of the responsibilities of those involved in primary industries to maintain that balance" (p.11).
3. "The increasing demand for these resources suggests the need for sound conservation and management practises" (p.34).

Evaluation	Correct 1, 2, 3	Incorrect
	Adequate 3	Inadequate 1, 2
	Impartial 3	Partial 1, 2

Summary Assessment

The document discusses the environment from a geographic prospective rather than from an environmental prospective. The document seldom refers to how the earth is being mismanaged by people.

Textbook #3

Publication Details

Clarke, B. W., & Wallace, John, K. (1989). Canada: Land of diversity. (2nd ed.). Scarborough, ON: Prentice Hall Canada.

Stated or Implied Purpose

Environmental Statements: Quantitative

Number of pages: 52 out of 506 or 10%
Number of chapters: 8 out of 38 or 21%
Number of illustrations: 21

Environmental Statements: Qualitative

Extinction.

1. "The reduced stream flow harmed both the size and quality of the muskrat habitat" (p. 102).
2. "Helicopters used for construction and transportation stampede the caribou. This causes their numbers to decrease" (p. 115).
3. "In Atlantic Canada, many rivers are losing their salmon because the waters are too acidic for eggs to hatch and young salmon to survive" (p. 273).

Evaluation.

Correct 1, 2, 3	Incorrect
Adequate 1, 2, 3	Inadequate
Impartial 1, 2, 3	Partial

Global Warming.

1. "How are people causing this global warming? The warming is the result of what is called the greenhouse effect" (p.77)

Evaluation.		
	Correct 1	Incorrect
	Adequate 1	Inadequate
	Impartial 1	Partial

Waste.

1. "One of the most serious issues facing the mining industry is its impact on the environment" (p. 348).
2. "The most dangerous form of water pollution results from the dumping of poisonous chemical wastes into our lakes and rivers" (p. 285).

Evaluation.		
	Correct 1, 2	Incorrect
	Adequate 1, 2	Inadequate
	Impartial 1, 2	Partial

Summary Assessment

The text stresses how the environment controls conditions but lacks to show what affect people have on the environment. The development of Canada's natural resources is emphasized in the text but it omits to discuss the serious environmental impact that the development has on the environment. Several good case studies are presented.

Text Book #18

Publication Details

Bruckman, H. J., & Cruickshanks, A. (1988). Understanding Chemistry. Toronto: John Wiley & Sons.

Stated or Implied Purpose

Environmental Statements: Quantitative

Number of pages:	43 out of 541 or 8%
Number of chapters:	11 out of 18 or 61%
Number of illustrations:	14

Environmental Statements: Qualitative

Extinction

1. "Birds suffer greatly when they come in contact with the oil; the oil causes their feathers to mat together and the birds can no longer fly our even float" (p. 18).

Evaluation.	Correct 1	Incorrect
	Adequate 1	Inadequate
	Impartial 1	Partial

Global Warming.

1. "What is the connection between CFCs and ozone? There were pessimistic forecasts that this would result in an increase in the incidence of skin cancer and might even affect the climate on the earth" (p. 447).

Evaluation.	Correct 1	Incorrect
	Adequate	Inadequate 1
	Impartial 1	Partial

Waste.

1. "The safe disposal of ever-increasing amounts of municipal and industrial wastes, some of which are highly toxic, is an important issue facing society today" (p. 328).
2. "As with other technologies, nuclear technology is neither inherently good nor bad" (p. 501).

Evaluation.	Correct 1, 2	Incorrect
	Adequate 1	Inadequate 2
	Impartial 1, 2	Partial

Summary Assessment

This text would seem to address the science and society emphasis which should be a component of all the new Ministry of Education courses in science. Environmental issues are given due attention, particularly waste management.

Text Book #20

Publication Details

Hirsch, A. J. (1981). Physics: A practical approach. Toronto: John Wiley & Son.

Stated or Implied Purpose

Environmental Statements: Quantitative

Number of pages:	5 out of 483 or 2%
Number of chapters:	2 out of 25 or 8%
Number of illustrations:	0

Environmental Statements: Qualitative

Extinction.

Evaluation.

Global Warming.

Evaluation.

Waste.

1. "Probably the greatest problem facing the nuclear industry is what to do with the waste products from fission reactions" (p. 463).

Evaluation.	Correct 1	Incorrect
	Adequate	Inadequate 1
	Impartial 1	Partial

Summary Assessment

This book was completely devoid of any discussion of environmental issues, although ample opportunities existed.

Text Book #21

Publication Details

Hirsch, A. J. (1986). Physics for a modern world. Toronto: John Wiley & Sons.

Stated or Implied Purpose

Environmental Statements: Quantitative

Number of pages:	35 out of 642 or 5%
Number of chapters:	3 out of 23 or 13%
Number of illustrations:	22

Environmental Statements: Qualitative

Extinction.

1. "Most unfortunately, what Fermi's team had constructed quickly led to the building of the first nuclear bomb" (p. 579).

Evaluation.

Correct 1	Incorrect
Adequate 1	Inadequate
Impartial 1	Partial

Global Warming

Evaluation.

Waste.

1. "It is the responsibility of all scientists, politicians, and citizens to ensure that future generations do not have to solve the problems caused by our technology" (p. 543).

Evaluation.

Correct 1	Incorrect
Adequate 1	Inadequate
Impartial 1	Partial

Summary Assessment

This text raises environmental issues and questions the impact of science on the environment.

VITA

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